

2021 Potato Cultivar Yield and Postharvest Quality Evaluations



WSU Potato Research Group



WASHINGTON STATE
UNIVERSITY

2021 Potato Cultivar Yield and Postharvest Quality Evaluations

Washington State University
Potato Research Group

PO Box 646414

Pullman, WA 99164-6414

<http://www.potatoes.wsu.edu/>

<http://www.pvmi.org>

Principal Investigators

Mark J. Pavек

Field Trials and Information

mjpavek@wsu.edu

Additional contact:

Zach Holden

zholden@wsu.edu

Jacob M. Blauer

Postharvest Trials and Information

jblauer@wsu.edu

Additional contact:

Nora Fuller, 509-335-4447

fullern@wsu.edu

Faculty and Staff

Nora Fuller

Raul "Rudy" G. Garza Jr.

Zachary J. Holden

Vito Cantu

Scott Mattinson

Special Thanks

John Steinbock; Mark Weber;

Mike Clouse; Martin Moore;

Washington State Potato Commission;

Growers and Industry; Tim Waters;

Northwest Potato Consortium;

Carrie Wohleb; Brian Clark; Paco Gonzalez;

Alexa Hintze; Francisco Atilano;

Carlos Gonzalez; Kendra Bertrand;

Rick Knowles; Lisa Knowles

On the cover: Harvesting late season
trials wearing proper PPE.

Table of Contents

Introduction	4
2021 Growing Season Temperatures	5
Guide to Clone Designations	6
Overall Cultivar and Clone Performance	7
Multi-Year Summaries of Graduating Russet Entries	8
Tri-State Specialty Yield Rankings (Washington)	9
Tri-State Tuber Comments (Washington)	10
Regional Tuber Comments (Washington)	11
Fresh Market Merit Scores (Washington)	12
Process Market Merit Scores (Washington)	14
Fresh Market Value - Methods	16
Process Value - Methods	17
Postharvest Procedures	18
Early Harvest Tri-State Trial (ETS)	
Trial Overview	22
Field Results	23
Economic Evaluations	26
Color Photographs	27
Late Harvest Tri-State Trial (LTS)	
Trial Overview	28
Field Results	32
Economic Evaluations	33
Color Photographs	36
Postharvest Results	42



Early Harvest Regional Trial (ERT)

Trial Overview	56
Field Results	57
Color Photographs	60
Economic Evaluations	61

Late Harvest Regional Trial (LRT)

Trial Overview	62
Field Results	66
Economic Evaluations	67
Color Photographs	70
Postharvest Results	74

Tri-State Specialty Trial

Trial Overview	90
Field Results	94
Postharvest Results	98
Color Photographs	102

Tri-State Chip Trial

Field Results	108
Postharvest Results	110
Color Photographs	112

Index of Clones and Cultivars

114

INTRODUCTION

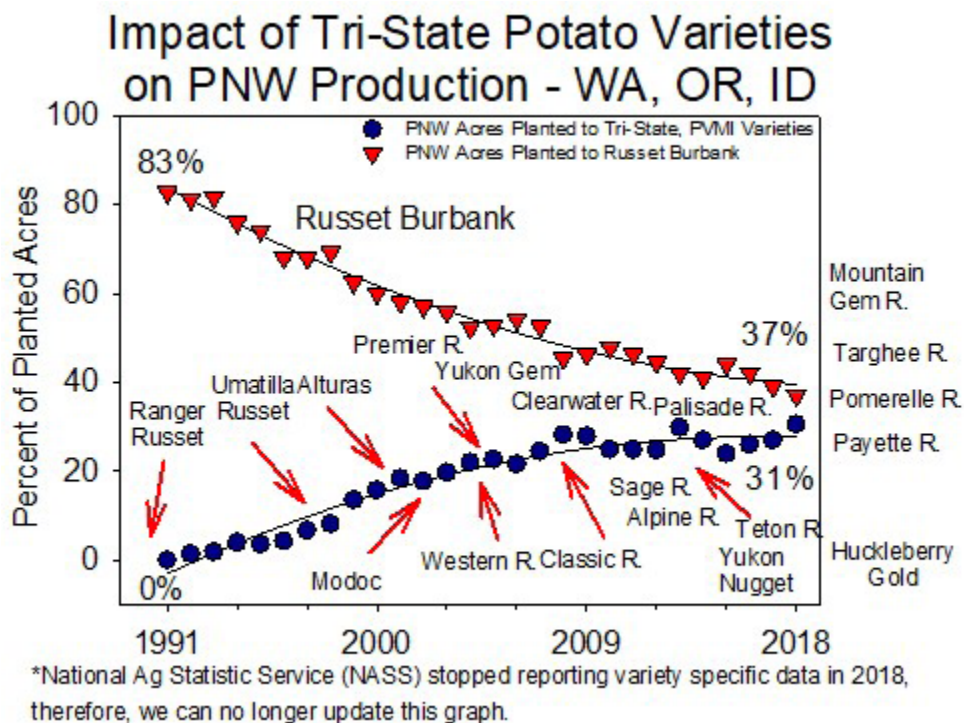
The 2021 Washington “Potato Cultivar Yield and Postharvest Quality Evaluations” is an annual report providing detailed information about promising new potato clones and cultivars grown in Washington conducted by the **Washington State University (WSU) Potato Research Group**. **Our mission:**

to identify and release new potato varieties that will provide profitable, sustainable production for the grower, improved competitiveness for the Washington and NW US potato industry, a healthy, inexpensive food supply for American consumers, and contributions towards a healthy environment.

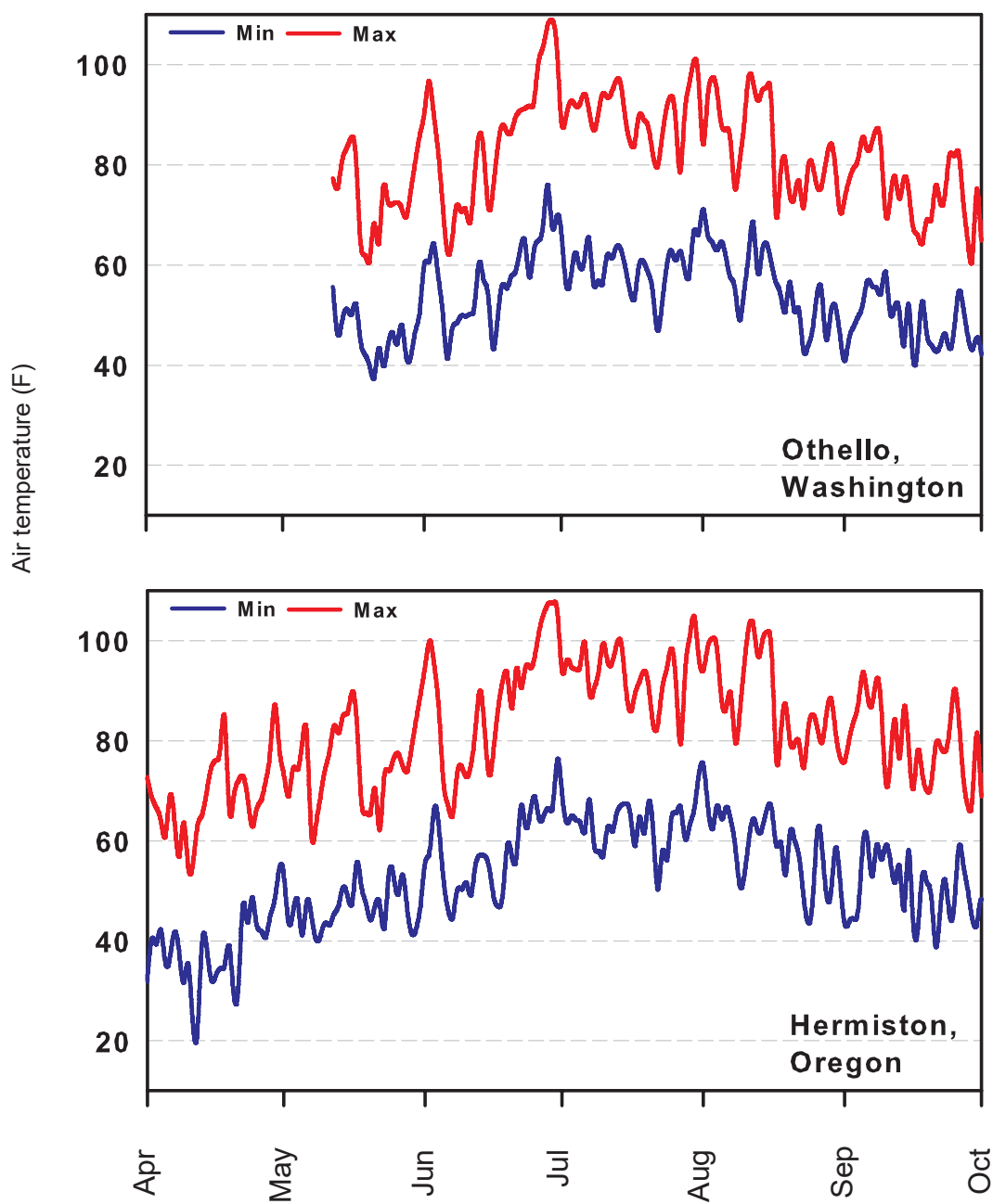
Tri-State trials include the newest clones which are created and evaluated in ID, OR, and WA by the USDA/ARS of Aberdeen, ID & Prosser, WA, Univ. of ID, OR State U., and WA State U. **Regional trials** include advanced clones from, and evaluated by, ID, OR, WA, CO, TX, and CA. Potato Commissions from the Tri-State area support and fund much of the variety development efforts.

Potato Variety Management Institute (PVMI) is a nonprofit organization that licenses and promotes Tri-State varieties. PVMI collects royalties from the varieties which are then distributed among the Tri-State research programs to support the ongoing development efforts. Learn more at www.pvmi.org.

Recent Accomplishments: (NOTE: Since 2018 NASS potato variety data has not been available for reasons unknown to the general public). The NWPVD program has produced a number of widely adopted varieties, among these varieties, **Ranger Russet**, **Umatilla Russet**, **Clearwater Russet**, **Alturas**, and **Bannock Russet** have greatly benefited the United States and Northwest potato industry and as such, were the **3rd, 4th, 9th, 12th** and **17th** most widely grown cultivars in the United States in 2021. Varieties released by the NWPVD Program are now produced on approximately 165,000 acres in the Pacific Northwest with value to growers estimated at approximately \$740 million. NWPVD varieties represented 32%, or 295,300 acres, of the 2021 fall crop nationally. The estimated 2021 US farm-gate value of NWPVD varieties was more than \$1.2 billion (values extrapolated from 2020 certified seed acres (<https://potatoassociation.org/seed-acres-reports/>) and NASS 2021).



2021 Growing Season Temperatures



Guide to Clone Designations

Example: ATX91137-1Ru

ATX91137-1Ru	Breeding Program (A berdeen, ID)
ATX91137-1Ru	Selection Site (T exas)
ATX 9 1137-1Ru	Year of Cross (1991)
ATX911 37 -1Ru	Cross Number (137)
ATX91137- 1 Ru	Tuber Selection (1)
ATX91137-1 Ru	Russet (Ru)

Location Codes

Designation		Breeding Program	Selection Program	Other
A	=	A berdeen, Idaho	A berdeen, Idaho	
AO	=	A berdeen, Idaho	O regon	
AOA	=	A berdeen, Idaho	O regon	A berdeen, Idaho
ATX	=	A berdeen, Idaho	T exas	
BTX	=	B eltsville, Maryland	T exas	
CO	=	C olorado		
MWTX	=	M adison W isconsin	T exas	
NDA	=	N orth D akota	A berdeen, Idaho	
NY	=	N ew Y ork		
PA	=	P rosser, WA	A berdeen, Idaho	
POR	=	P rosser, WA	O regon	
TC	=	T exas	C olorado	
TXA	=	T exas	A berdeen, Idaho	
TXNS	=	T exas		N orkotah S train
OR	=	Hermiston, O regon	O regon	

Miscellaneous Designations

PA97 B 3-2	B	=	Chuck B rown's cross
A93157-6 LS	LS	=	Low S ugar
CO94165-3 P/P	P/P	=	P urple skin & P urple flesh
A96741-2 R	R	=	R ed skin
CO94183-1 R/R	R/R	=	R ed skin / R ed flesh
VC0967-2 R/Y	R/Y	=	R ed skin / Y ellow flesh
ATX92230-1 Ru	Ru	=	R usset skin
VC1009-1 W/Y	W/Y	=	W hite skin & Y ellow flesh
A97066-42 LB	LB	=	Late B light resistance
AC9923 PW/Y	PW/Y	=	P urple skin with W hite eyes/ Y ellow flesh
AC9653 P/Y	P/Y	=	P urple skin/ Y ellow flesh
CO977-2 P/PW	P/PW	=	P urple skin/ P urple & W hite flesh
A99029-3 E	E	=	E arly maturing
A0008-1 TE	TE	=	T etonia, ID Selection, Early maturing
A07008-4 T	T	=	T etonia, ID Selection, Late maturing
A06914-3 CR	CR	=	C orky R ingspot resistance
A06862-18 VR	VR	=	V irus R esistance

OVERALL CULTIVAR & CLONE PERFORMANCE

Merit Score Methods

Overview: Overall performance for each entry was rated on a scale of 1 to 5; 5 indicating the best performance possible. The methods are explained below. Economic analysis methods are explained on pages 16 (Fresh) and 17 (Process).

FRESH MARKET MERIT SCORE METHODS:

75% Fresh market economic value

25% Internal quality – blackspot bruise, shatter bruise, hollow heart, internal brown spot, and brown center. An average merit value is taken. Of the five internal categories listed above, the worst internal defect or bruise rating for each cultivar is weighted 50% so serious bruise or defect problems are reflected in the final merit score.

Researcher's Discretion: The overall merit score may be reduced by up to 50% for any unacceptable trait not quantified in the data (e.g. poor appearance or poor flavor).

EARLY PROCESS MARKET MERIT SCORE METHODS:

75% Early harvest process market economic value

25% Internal quality – blackspot bruise, shatter bruise, hollow heart, internal brown spot, and brown center. An average merit value is taken. Of the five internal categories listed above, the worst internal defect or bruise rating for each cultivar is weighted 50% so serious bruise or defect problems are reflected in the final merit score.

Researcher's Discretion: The overall merit score may be reduced by up to 50% for any unacceptable trait not quantified in the data.

LATE PROCESS MARKET MERIT SCORE METHODS:

For the late process market, a merit score is listed for both field and post-harvest performance.

Field/Economic Performance – methods are the same as “Early Process Market Merit Score Methods” shown above, with the exception that a late harvest economic analysis is conducted.

Post-Harvest Performance – see “Postharvest Procedures” section near front of book.

Researcher's Discretion:

The overall merit score may be reduced by up to 50% for any unacceptable trait not quantified in the data.

WA Multi-Year Summaries of Graduating Russet Entries and Reference Varieties

Entry	Year	Average Tuber						Merit Scores (5 = Best)		
		Early/Late* Harvest	US # 1 & 2 Yield > 6 oz	Specific Gravity	Weight/ Number per Plant	Bruise Blackspot/ Shatter	Internal** Issues	Field Performance		Postharvest Processing Performance
		Total Yield			oz/number	%		Early/Late Fresh	Early/Late Process	
POR12NCK50-1	2021	CWT/A	% of Total							
	2021	494/781	89	1.080	11.5/6.1	4/67	none	4.6/3.0	3.9/3.0	3.1
	2020	685/916	84	1.083	8.6/9.5	13/70	5% IBS	3.7/2.7	4.7/4.0	2.8
	2019	703/1046	86	1.081	9.9/10.1	0/49	none	2.6/2.3	4.2/4.5	3.4
	2018	497/885	89	1.082	9.8/8.5	7/59	none	2.9/2.2	4.1/3.3	2.6
	2017	473/807	86	1.09	9.5/7.4	5/32	none	3.4/1.9	3.7/3.7	3.2
Nice skin, dark, looks like Russet Norkotah, occasional skin appearance issues, shatter and skinning if harvested immature.										
OR12133-10	2021	662/1214	81	1.075	8.5/12.8	13/55	3% BC, 3% IBS	1.8/2.1	3.0/3.6	2.4
	2020	666/1174	88	1.078	10.3/10.3	18/65	none	2.3/2.1	4.0/3.7	2.4
	2019	825/1276	86	1.076	11.2/10.9	5/78	none	1.9/1.8	3.8/1.2	2.4
	2018	536/1271	88	1.080	11.1/11.0	13/68	none	2.1/2.0	4.4/2.6	3.9
High yields, good overall shape and length for processing, may compete with Shepody as an early processing potato.										
Ranger R.	2021	587/1087	64	1.081	8.1/12.1	24/18	3% IBS	NA	2.4/2.8	2.4
	2020	567/911	86	1.078	10.7/7.6	28/45	3% BC	NA	2.7/2.7	2.8
	2019	599/1051	86	1.078	11.5/8.8	19/19	none	NA	3.4/3.2	3.2
	2018	491/899	86	1.082	11.8/7.3	60/30	3% IBS	NA	3.7/3.6	4.0
	2017	453/754	81	1.910	8.3/7.9	33/48	none	NA	2.7/2.9	2.4
Long, shape variable, but often uniform; 7 to 9 tubers per plant typical.										
R. Burbank	2021	529/1026	59	1.070	8.8/10.5	6/28	6% BC, 3% IBS	0.7/0.6	1.2/1.1	1.4
	2020	667/1052	72	1.076	8.7/10.9	15/70	18% BC, 3% IBS	1.3/1.3	2.7/2.2	1.3
	2019	584/1085	77	1.077	11.4/9.1	6/64	12% IBS	1.6/1.3	3.3/2.5	1.5
	2018	633/863	81	1.080	10.4/7.9	48/58	3% IBS	2.4/1.3	2.5/2.2	2.2
	2017	428/752	77	1.088	8.2/8.0	13/53	10% HH, 13% BC	1.0/0.9	3.9/3.2	2.3
Shape typically variable, often with many growth cracks and knobs; 7 to 9 tubers per plant typical, long storage variety.										
Clearwater R.	2021	526/1010	74	1.080	7.4/12.3	7/27	7% IBS	2.8/2.5	3.0/4.2	3.0
	2020	684/979	80	1.079	8.3/10.5	0/58	none	2.8/2.1	4.5/3.8	2.5
Typy, dark russetting, uniform shape, susceptible to fusarium dry rot.										
R. Norkotah (Fresh Market) only	2021	563/895	72	1.064	7.3/11.0	0/13	3% IBS	3.4/3.1	NA	NA
	2020	500/661	75	1.066	8.0/7.4	15/38	none	1.8/1.3	NA	NA
	2019	575/814	79	1.065	9.0/8.6	0/15	none	3.4/2.6	NA	NA
	2018	511/785	86	1.071	10.4/7.1	25/25	none	2.8/2.0	NA	NA
	2017	545/685	76	1.076	7.7/7.7	23/43	none	5.0/2.6	NA	NA
Shape and skin typically very uniform, size profile typically on the small side; 7 to 8 tubers per plant typical.										
Shepody (Early Harvest) only	2021	508	46	1.068	5.1/9.9	0/10	3% IBS	NA	NA	-
	2020	621	85	1.078	9.5/6.4	0/0	3% IBS	NA	NA	-
	2019	788	83	1.076	9.8/8.4	0/10	none	NA	3.9/NA	-
	2018	621	87	1.072	12.6/5.1	3/0	none	NA	3.9/NA	-
	2017	415	80	1.077	8.3/6.0	7/0	none	NA	3.4/NA	-
Early-harvest processing variety. Early-harvest post-harvest merit not evaluated as this and most varieties typically produce acceptable fries directly from the field. 5-6 tubers per plant typical.										

*Early Harvest ~ 110 days after planting, Late Harvest ~ 150 DAP.

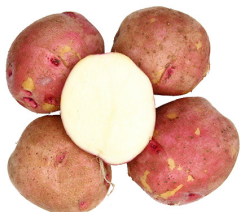
**HH = Hollow heart, BC = brown center, IBS = internal brown spot.

2021 Tri-State Specialty Potato Clones - Washington State University

2021 Tri-State Specialty Trial					
US#1 Yield CWT/A	US #1 Yield		Fresh Market Appearance 5 = best	(See also Tri-State Specialty Section near end of book)	Comments
	2021				
	0-6 oz	6-10oz			
	-----%-----				
<u>Red Skin/White Flesh*</u>					
Chieftain	658	49	42	3.3	Medium size, good skin set.
Modoc	646	65	31	4.0	Oblong, red, nice color, skin set not great.
A08122-12Rsto	629	93	7	4.0	Nice round smooth shape, some skinning.
NDA8512C-1R	489	50	43	4.0	Nice dark red, skinning, growth cracks.
<u>Red-Purple/Yellow Flesh</u>					
A08122-9RY	668	92	7	3.0	Color is a bit variable, nice shape.
A11573-5RYsto	629	96	4	4.0	Bright red, small, skin set not great.
<u>Yellow Flesh</u>					
Yukon Gold	582	31	42	2.3	Extreme size range, yellow/white with russetting.
Bintje	693	78	20	1.8	Oblong, bumpy, ugly skin, yellow.
A08120-4Y	432	100	0	3.7	Small, bright, white/yellow with pink eyes.
A11576-1Ysto	652	92	8	2.8	Rhizoc, yellow, variable sizes, with some russetting.
POR16PG34-1	600	95	5	2.3	Nice shape, bad skin.
<u>Purple/Purple Flesh</u>					
Purple Majesty	608	92	8	2.0	Purple river rocks, smooth shape, with bronzing.
OR11157-1	91	98	2	1.0	Low yield, ugly, 2nd growth, non uniform shape.
POR16PG25-2	539	85	14	3.0	Oblong, dark purple, some bronzing.

*Skin/Flesh Color: R = Red, W = White, Y = Yellow, P = Purple, Rus = Russet, Buff = off-white with or without light russetting.

Chieftain



Modoc



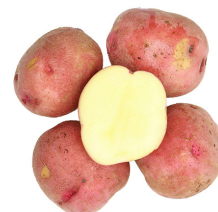
A08122-12Rsto



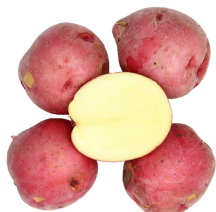
NDA8512C-1R



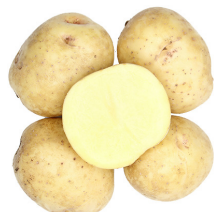
A08122-9Y



A11573-5RYsto



Yukon Gold



Bintje



A08120-4Y



A11576-1Sto



POR16PG34-1



Purple Majesty



OR11157-1



POR16PG25-2



At-Harvest Grading Comments & Fresh Market Appearance

Newest Lines - 2021 Tri-State Trials			
Fresh Market Appearance 1-5 (5 = Best)			
Clone	2021	2020	Tuber Appearance Comments*
Early Harvest Tri-State			
Clearwater Russet	4.0	4.0	Typy, smooth shape, some lenticils.
Ranger Russet	3.0	2.0	Long, mix of shapes.
Russet Burbank	1.7	1.0	Medium russet, good length, some typy, some pointy.
Russet Norkotah	4.0	3.7	Dark russet, typy, good length.
Shepody	1.0	2.7	Light skin, pointy, non uniform shape.
A09086-1LB	1.7	-	Larger, feathery skin, shape variable.
A09136-9LB	2.3	-	Variable shape, light skin, medium russet.
A10130-1	1.3	-	Plump, with ugly skin.
A10594-4sto	3.3	3.0	Typy, but a bit short.
A11175-12TE	3.3	-	Small, typy, but short. Not Early.
A11259-1	2.3	-	Deep eyes, shape a bit irregular, rhizoc.
A11326-1	2.3	-	Medium russet, not early, somewhat typy, smaller.
A12114-7	3.0	-	Some typy, short, round.
A12305-2adg	3.0	3.3	Plump, swollen lenticils. Ok length, some points.
AFA5661-8	3.0	2.0	Light russet, good shape, size, and length.
AOR11217-3	4.0	3.7	Looks like Norkotah, dark skin, good length.
AOR13064-2	3.3	-	Dark russet with swollen lenticils.
Late Harvest Tri-State			
Clearwater Russet	4.0	3.0	Medium-dark russet, nice skin. Uniform shape.
Ranger Russet	1.0	2.5	Very poor shape, non uniform.
Russet Burbank	1.0	2.3	Long, skinny, mishapen.
Russet Norkotah	4.0	3.5	Nice dark russet skin. Uniform shape.
A09086-1LB	2.5	-	Light russet, feathery skin, mostly typy, a bit short.
A09136-9LB	1.3	-	River rocks, oval, bumpy.
A10130-1	1.0	-	Plump, ugly, spotty skin, lots of points.
A10594-4sto	3.0	3.0	Shape fairly uniform, eyes a bit deep, good length.
A11175-12TE	2.5	-	Smaller, short, shape mostly uniform.
A11259-1	1.0	-	Skinny, long, cracks, and malformed. Discard
A11326-1	2.0	-	Larger, exposed lenticils, ugly skin.
A12114-7	2.5	-	Small, short, round.
A12305-2adg	1.8	2.3	Good length, pointy, poor skin set.
AFA5661-8	1.5	2.3	Many #2's with end cracks.
AOR11217-3	3.0	3.3	Nice, dark skin, shape mostly uniform. Deep eyes.
AOR13064-2	2.3	-	Larger, shape mostly uniform. Exposed lenticils.

*Typy - Visually appealing, uniform tuber shape.

AOR11217-3



EARLY

Clearwater Russet



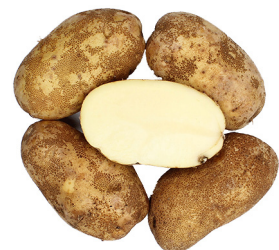
EARLY

Clearwater Russet



LATE

AOR11217-3



LATE

At-Harvest Grading Comments & Fresh Market Appearance

Advanced Lines - 2021 Regional Trials				
Fresh Market Appearance 1-5 (5 = Best)				
Clone	2021	2020	2019	Tuber Appearance Comments*
Early Harvest Regional				
Clearwater Russet	4.0	4.0	-	Smooth shape, medium russet, typy.
Ranger Russet	2.0	2.5	2.3	Variable shape and size, good length, some points.
Russet Burbank	1.0	2.7	2.0	Lots of knobs, rough shapes.
Russet Norkotah	4.0	3.0	4.0	Typy, dark russet, good length.
Shepody	1.0	2.0	2.0	Ugly shape, light skin, skinny.
AOR08540-1	2.3	3.0	3.7	Irregular shapes, good length, smaller.
AOR10204-3	4.0	2.7	2.3	Larger, mostly typy, dark russetting.
CO10085-1RU	3.0	2.0	-	Small, short, medium russet, swollen lenticils
CO11009-3RU	3.0	4.0	-	Mostly typy, medium to dark russet.
CO12378-1RU	4.0	-	-	Heavy russet, good skin set, small, typy.
COA11013-2	2.3	2.7	2.0	Variable shape and size, some curves.
OR12133-10	2.0	2.0	2.0	Good length, light feathery skin.
POR12NCK50-1	4.0	3.0	3.0	Looks like Russet Norkotah, typy, dark russet.
TX13590-9Ru	3.0	2.3	-	Short, some round, uniform shape.
Late Harvest Regional				
Clearwater Russet	4.0	3.5	-	Uniform shape and size, nice skin.
Ranger Russet	1.0	2.3	2.5	Long, skinny, mostly mishapen.
Russet Burbank	1.0	2.3	2.0	Long, skinny, dumb bells, knobs, cracks, ugly.
Russet Norkotah	4.0	3.0	3.3	Eye appeal. Uniform shape, nice skin.
AOR08540-1	1.0	1.3	3.0	Bad greening, shape extremely variable
AOR10204-3	2.0	2.0	2.8	Ugly skin, some elephant hide on bud end.
CO10085-1RU	2.0	2.5	-	Many round or short, too round for WA.
CO11009-3RU	3.3	3.5	-	Nice dark skin, some tubers short and lumpy.
CO12378-1RU	3.0	-	-	Thick skin, too small. Discard
COA11013-2	2.0	2.3	2.8	Good length, but a lot of #2's. Greening issue, discard.
OR12133-10	1.8	2.5	-	Good overall shape and length, good french fry.
POR12NCK50-1	4.0	3.0	2.5	Nice skin, dark, looks like Russet Norkotah.
TX13590-9Ru	2.0	2.0	-	Oval, plump, many round, too short for WA.

*Typy - Visually appealing, uniform tuber shape



FRESH MARKET MERIT - NEWEST LINES

2019-2021

(5 = best) - Entries ranked by means

EARLY HARVEST - Fresh Market Merit Scores

Entry	Mean	2021	2020	2019
1 AOR11217-3	3.7	4.1	4.3	2.7
2 A12305-2adg	3.4	3.8	3.0	-
3 AOR13064-2	3.4	3.4	-	-
4 Russet Norkotah	2.7	4.3	1.7	2.1
5 A10594-4sto	2.5	3.7	1.3	-
6 A10130-1	2.4	2.4	-	-
7 Ranger Russet	2.3	3.5	1.8	1.8
8 AFA5661-8	2.3	3.8	0.9	-
9 Clearwater Russet	2.2	2.4	2.0	-
10 A12114-7	2.1	2.1	-	-
11 A09136-9LB	1.9	1.9	-	-
12 A11175-12TE	1.9	1.9	-	-
13 A11259-1	1.8	1.8	-	-
14 Russet Burbank	1.3	1.0	1.3	1.7
15 A09086-1LB	1.3	1.3	-	-
16 A11326-1	0.6	0.6	-	-

LATE HARVEST - Fresh Market Merit Scores

Entry	Mean	2021	2020	2019
1 AOR11217-3	3.3	2.8	3.1	3.9
2 Russet Norkotah	3.2	3.5	3.5	2.6
3 A10594-4sto	2.5	2.7	2.3	-
4 Clearwater Russet	2.5	2.5	2.5	-
5 A09086-1LB	2.3	2.3	-	-
6 A12305-2adg	2.2	2.1	2.3	-
7 A11326-1	2.0	2.0	-	-
8 A11175-12TE	1.7	1.7	-	-
9 Ranger Russet	1.6	1.2	1.6	2.1
10 AOR13064-2	1.6	1.6	-	-
11 AFA5661-8	1.6	1.6	1.5	-
12 A12114-7	1.4	1.4	-	-
13 Russet Burbank	1.0	0.6	1.3	1.2
14 A09136-9LB	1.0	1.0	-	-
15 A10130-1	1.0	1.0	-	-
16 A11259-1	0.9	0.9	-	-

For more information on these cultivars, see the Early and Late Harvest Regional Trial Sections in this book. The dash (" - ") indicates the clone was not yet entered into the trial.

FRESH MARKET MERIT - ADVANCED LINES

2017-2021

(5 = best) - Entries ranked by means

EARLY HARVEST - Fresh Market Merit Scores						
Entry	Mean	2021	2020	2019	2018	2017
1 POR12NCK50-1	3.4	4.6	3.7	2.6	2.9	3.4
2 AOR10204-3	3.3	4.9	2.1	2.5	3.8	-
3 Russet Norkotah	3.3	3.4	1.8	3.4	2.8	5.0
4 TX13590-9Ru	2.8	3.5	2.1	-	-	-
5 Clearwater Russet	2.8	2.8	2.8	-	-	-
6 AOR08540-1	2.7	1.3	3.8	3.0	3.0	-
7 CO11009-3RU	2.2	2.5	1.9	-	-	-
8 Ranger Russet	2.1	1.4	1.4	1.7	2.6	3.1
9 OR12133-10	2.0	1.8	2.3	1.9	2.1	-
10 COA11013-2	1.4	1.3	2.4	0.7	-	-
11 Russet Burbank	1.4	0.7	1.3	1.6	2.4	1.0
12 CO12378-1RU	1.3	1.3	-	-	-	-
13 CO10085-1RU	0.8	0.7	1.0	-	-	-

LATE HARVEST - Fresh Market Merit Scores						
Entry	Mean	2021	2020	2019	2018	2017
1 POR12NCK50-1	2.4	3.0	2.7	2.3	2.2	1.9
2 Russet Norkotah	2.3	3.1	1.3	2.6	2.0	2.6
3 Clearwater Russet	2.3	2.5	2.1	-	-	-
4 CO11009-3RU	2.2	2.4	2.0	-	-	-
5 OR12133-10	2.0	2.1	2.1	1.8	2.0	-
6 CO12378-1RU	2.0	2.0	-	-	-	-
7 TX13590-9Ru	1.7	1.9	1.6	-	-	-
8 AOR10204-3	1.7	2.5	0.9	1.9	1.5	-
9 COA11013-2	1.7	1.3	2.1	1.7	-	-
10 AOR08540-1	1.4	1.1	1.1	2.3	1.3	-
11 CO10085-1RU	1.4	1.3	1.5	-	-	-
12 Russet Burbank	1.1	0.6	1.3	1.3	1.3	0.9
13 Ranger Russet	1.0	0.6	1.1	1.4	0.9	1.0

For more information on these cultivars, see the Early and Late Harvest Regional Trial Sections in this book. The dash (" - ") indicates the clone was not yet entered into the trial.

PROCESS MARKET MERIT - NEWEST LINES

2019-2021

(5 = best) - Entries ranked by Field Performance means

EARLY HARVEST - Process Market Merit Scores				
Entry	Field Performance Mean	Field Performance Only*		
		2021	2020	2019
1 AOR11217-3	4.6	4.7	4.8	4.9
2 A12305-2adg	4.4	4.5	4.4	-
3 AOR13064-2	3.4	4.2	-	-
4 Ranger Russet	3.2	4.0	1.8	3.8
5 A10594-4sto	3.2	3.9	2.4	-
6 A09136-9LB	3.1	3.2	-	-
7 A09086-1LB	2.8	3.0	-	-
8 A10130-1	2.3	2.7	-	-
9 A11175-12TE	2.2	1.9	-	-
10 A12114-7	2.7	2.6	-	-
11 Shepody	2.5	1.5	3.3	3.4
12 AFA5661-8	2.4	2.8	1.5	-
13 A11259-1	2.3	3.0	-	-
14 Russet Burbank	2.1	1.2	1.6	3.6
15 Russet Norkotah	2.0	2.8	1.6	1.6
16 A11326-1	1.9	2.2	-	-
17 Clearwater Russet	1.8	1.4	2.2	-

*Postharvest values are not given for the Early Harvest Trial because all varieties typically fry well when delivered directly from the field and cold storage is not typical. The dash (" - ") indicates the clone was not yet entered into the trial.

LATE HARVEST - Process Market Merit Scores								
Field & Postharvest Processing Performance								
Entry	All Years		2021		2020		2019	
	Field Mean	Post Harvest Mean	Field	Post Harv	Field	Post Harv	Field	Post Harv
1 A09086-1LB	4.7	2.1	4.7	2.1	-	-	-	-
2 A11326-1	4.4	2.4	4.4	2.4	-	-	-	-
3 AOR11217-3	4.2	3.4	3.6	2.8	4.5	3.4	4.5	3.9
4 AFA5661-8	3.9	2.5	3.8	2.3	4.1	2.7	-	-
5 A12305-2adg	3.8	1.9	3.3	1.4	4.2	2.4	-	-
6 AOR13064-2	3.8	4.0	3.8	4.0	-	-	-	-
7 Clearwater Russet	3.7	2.5	3.4	2.5	4.1	2.4	-	-
8 Ranger Russet	3.5	2.9	3.4	2.6	3.8	2.8	3.5	3.2
9 A10594-4sto	2.9	3.3	3.5	3.4	2.3	3.3	-	-
10 A09136-9LB	2.8	3.1	2.8	3.1	-	-	-	-
11 A10130-1	2.4	1.4	2.4	1.4	-	-	-	-
12 A12114-7	2.1	1.8	2.1	1.8	-	-	-	-
13 A11175-12TE	2.1	3.4	2.1	3.4	-	-	-	-
14 Russet Burbank	1.8	1.9	1.7	1.3	1.6	1.8	2.1	2.6
15 Russet Norkotah	1.8	na	2.2	na	1.5	na	1.6	na
16 A11259-1	1.5	2.1	1.5	2.1	-	-	-	-

For more information on these cultivars, see the Early and Late Harvest Regional Trial sections in this book. Varieties with 'fresh' were designated for direct processing or fresh market only and are indicated with "na".

PROCESS MARKET MERIT - ADVANCED LINES 2017-2021

(5 = best) - Entries ranked by Field Performance means

EARLY HARVEST - Process Market Merit Scores						
Entry	Field Performance Mean	Field Performance Only*				
		2021	2020	2019	2018	2017
1 POR12NCK50-1	4.1	3.9	4.7	4.2	4.1	3.7
2 AOR08540-1	3.8	3.2	4.3	4.0	3.9	-
3 OR12133-10	3.8	3.0	4.0	3.8	4.4	-
4 Clearwater Russet	3.7	3.0	4.5	-	-	-
5 TX13590-9Ru	3.5	3.8	3.3	-	-	-
6 AOR10204-3	3.5	3.9	2.7	4.0	3.4	-
7 Shepody	3.2	1.4	3.2	3.9	3.7	3.9
8 Ranger Russet	3.1	2.4	2.7	3.4	3.2	3.7
9 CO11009-3RU	2.9	3.7	2.0	-	-	-
10 COA11013-2	2.8	2.1	4.1	2.3	-	-
11 Russet Burbank	2.7	1.2	2.7	3.3	2.5	3.9
12 Russet Norkotah	2.5	2.7	1.4	2.7	3.2	2.5
13 CO10085-1RU	2.1	2.0	2.1	-	-	-
14 CO12378-1RU	1.7	1.7	-	-	-	-

*Postharvest values are not given for the Early Harvest Trial because all varieties typically fry well when delivered directly from the field and cold storage is not typical. The dash (" - ") indicates the clone was not yet entered into the trial.

PROCESS MARKET MERIT - ADVANCED LINES 2017-2021

(5 = best) - Entries ranked by Field Performance means

LATE HARVEST - Process Market Merit Scores													
Field & Postharvest Processing Performance													
All Years													
				2021		2020		2019		2018		2017	
		Post											
		Field	Harvest	Field	Post	Field	Post	Field	Post	Field	Post	Field	Post
Entry		Mean	Mean	Field	Harv	Field	Harv	Field	Harv	Field	Harv	Field	Harv
1	Clearwater Russet	4.0	2.8	4.2	3.0	3.8	2.5	-	-	-	-	-	-
2	CO11009-3RU	4.0	4.2	4.4	4.6	3.6	3.9	-	-	-	-	-	-
3	POR12NCK50-1	3.7	3.0	3.0	3.1	4.0	2.8	4.5	3.4	3.3	2.6	3.7	3.2
4	Ranger Russet	3.0	3.0	2.8	2.4	2.7	2.8	3.2	3.2	3.6	4.0	2.9	2.4
5	CO12378-1RU	2.9	4.3	2.9	4.3	-	-	-	-	-	-	-	-
6	OR12133-10	2.7	2.8	3.6	2.4	3.7	2.4	1.2	2.4	2.6	3.9	2.6	-
7	CO10085-1RU	2.7	2.0	1.6	1.9	3.8	2.1	-	-	-	-	-	-
8	AOR10204-3	2.6	na	3.4	na	2.1	na	3.1	na	1.9	na	-	-
9	TX13590-9Ru	2.5	na	3.1	na	1.9	na	-	-	-	-	-	-
10	AOR08540-1	2.3	2.4	2.4	2.1	2.4	2.7	1.9	na	2.5	na	-	-
11	COA11013-2	2.3	na	1.7	na	2.9	3.1	2.3	3.6	-	-	-	-
12	Russet Burbank	2.2	1.7	1.1	1.4	2.2	1.3	2.5	1.5	2.2	2.2	3.2	2.3
13	Russet Norkotah	1.7	na	2.0	na	1.5	na	2.2	na	1.5	na	1.3	na

For more information on these cultivars, see the Early and Late Harvest Regional Trial sections in this book. Varieties with 'fresh' were designated for direct processing or fresh market only and are indicated with "na".

Fresh Market Value - Methods

Economic Potential

The gross return in U.S. dollars per acre for each trial entry was calculated using WA (Columbia Basin) four-year average fresh potato prices. Production costs per acre were not applied. All assumptions are listed in the table below. Assessing the fresh value of a given lot of potatoes is difficult because the actual market allows fresh-pack sheds to utilize a mix of tuber sizes, packaging, and marketing opportunities to maximize income potential. Following discussions with actual pack-sheds and complying with USDA standards, the packaging and size ranges described below provide a good base for variety comparison. A packaging and handling fee (pack-shed operating fee) of \$4.00 was assessed on each CWT of potatoes. This economic evaluation does not fully account for consumer preferences for each trial entry.

Fresh-pack market 4-year average shipping point prices per tuber size and grade with associated pack-fees.

Markets/Packaging ^a	Range of Tuber Sizes for Each Package Type and USDA Grade		Four Year WA State Columbia Basin Average Prices ^c	Pack-Shed Fee: Packaging and Handling	Adjusted Value
	U.S. No. 1 ^b	U.S. No. 2			
	oz	oz	\$/CWT	\$/CWT	\$/CWT
<u>50 lb cartons</u>					
100 Count	7 to 8.5		\$13.54	\$4.00	\$9.54
90 Count	8.5 to 9.5		\$14.71	\$4.00	\$10.71
80 Count	9.5 to 10.5		\$17.02	\$4.00	\$13.02
70 Count	10.5 to 12.5		\$17.62	\$4.00	\$13.62
60 Count	12.5 to 14		\$17.61	\$4.00	\$13.61
50 Count	14 to 18		\$17.06	\$4.00	\$13.06
<u>10 lb Film Bags</u>					
Non-size A	4 to 7		\$9.15	\$4.00	\$5.15
100 lb Burlap Sacks					
10 oz Min. Size U.S. No. 2		10 to 20	\$8.60	\$4.00	\$4.60
10 oz Min. Size U.S. No. 2	18 to 20		\$8.60	\$4.00	\$4.60
<u>Bulk</u>					
Process-Culls	< 4	< 10	\$4.00	\$4.00	\$0.00
Process-Culls	> 20	> 20	\$4.00	\$4.00	\$0.00

^aCount = tuber number per 50 lb carton.

^b18 to 20 oz U.S. No. 1 tubers are typically of marginal value on the fresh market due to their large size. They were therefore priced as U.S. No. 2, 10 oz minimum size.

^cSales F.O.B. Shipping Point, market periods 2008-2011 (USDA Federal-State Market News Service 2008-2011). Process-culls priced at regional process-cull market value.

Process Value - Methods

Early Harvest

Economic Potential

The gross return in U.S. dollars per acre for each trial entry was calculated using an early harvest mock processing contract similar to those used by Washington State processors. All assumptions are listed below.

Contract Assumptions:

1. Base price of \$160/ton.
 - a. Base price is an average of early-harvest Ranger Russet contracts from Washington processors.
2. To compensate for yield loss due to early harvest, the base price was increased by \$1.00/ton per day for each day potatoes were harvested earlier than Sept. 1.
3. Early harvest quality parameters were identical to those mentioned below in the Late Harvest Process Value – Methods.

Late Harvest

Economic Potential

The gross return in U.S. dollars per acre for each trial entry was calculated using a late-harvest mock processing contract. Process-market values are based on criteria (below) similar to that used by WA potato processors. Production costs per acre were not applied. Direct delivery contract assumptions are listed below.

Contract Assumptions:

1. **Base price:** \$160/ton for market (U.S. #1 & 2) grade tubers.
2. **Six oz clause:** Premiums for market grade tubers 6 oz or greater of \$0.80/ton for each percentage point >53% of the total tuber yield composite, with premium maximum not to exceed a total of \$12.00/ton. Penalties were \$1.00/ton for each percentage point below 53% > 6 oz tubers; below 40% > 6 oz, lots were penalized \$20/ton.
3. **US #1 clause:** Premiums for US #1 grade tubers 6 oz or greater of \$0.40/ton for each percentage point >60% of the total tuber yield composite, with premium maximum not to exceed a total of \$10.00/ton. Penalties were \$0.20/ton for each percentage point below 60% > 6 oz US #1 tubers, with the penalty maximum not to exceed a total of \$4.20/ton.
4. **Undersized clause:** Market grade potatoes <4 oz (process culls) were valued at \$60.00/ton.
5. **Specific Gravity clause:** Premiums per ton were \$1.00 at 1.078, \$3.00 at 1.079, \$5.00 at 1.080, \$7.00 at 1.081, \$8.00 at 1.082, \$9.00 at 1.083, with a maximum of \$10.00 for 1.084 through 1.088. Above 1.088 premiums were as follows: \$9.00 at 1.089, \$8.00 at 1.090, \$7.00 at 1.091, \$6.00 at 1.092, \$5.00 at 1.093, \$4.00 at 1.094, \$3.00 at 1.095, \$2.00 at 1.096, \$1.00 at 1.097. \$0.00 at 1.098 and \$0.00 at 1.099. Above 1.099, lots were penalized \$1.00/ton with no ceiling. No premium or penalty for a value of 1.077. Penalties per ton were \$5.00 at 1.076, \$10.00 at 1.075, and \$15.00 at 1.074. Below 1.074, lots were penalized \$20.00/ton with no rejection minimum.
6. No premiums or penalties were applied for bruise, tuber fry color, sugar content, or internal defects.

2021 Postharvest Procedures

Early Harvest

Culinary and quality characteristics of clones from the Red/Specialty Trial were evaluated after oven-baking, microwaving and boiling. Four- to six-ounce tubers were selected for the cooking protocols described below. After cooking, each tuber was halved from stem to bud end. One half was immediately tasted and evaluated on a scale from 1 to 5 (5 is best) for texture, flavor, tuber center, and skin characteristics. The remaining half was incubated for 30 minutes at room temperature and after-cooking-darkening was then graded on a 1 to 5 scale based on a color chart for white- and yellow-fleshed clones (1 = excessive graying, 5 = no discoloration).

Oven Baking - Tubers were pierced twice with a fork on each side and baked at 400°F for 1 hour.

Boiling - Tubers were cooked in a sieved double-boiler for 1 hour after coming to a boil.

Microwaving - Tubers were pierced twice with a fork on each side and cooked for 10 minutes at the outer edge of a microwave oven (high setting). The tubers were then turned over and moved to the center of the microwave where they were cooked an additional 10 minutes. Four-tuber samples from each of two clones (eight tubers total) were cooked simultaneously.

Cooking Time – was determined on 0.5-inch x 0.5-inch cores of tuber tissue cut from the stem (2 cores) and bud (2 cores) ends of 4 tubers of each clone. To prepare the cores, a 0.5-inch-thick longitudinal section was removed from the center of each tuber. Two cores were then cut from each end, one from the cortical area just beneath the periderm and one from the center region. The cores were placed in boiling water and timed until a weighted (90-g) pin penetrated the tissue.

Chipping - Tubers were cut longitudinally from stem to bud end. One half was sliced into 0.05-inch thick chips. The first slice was discarded to ensure uniform thickness of the second slice, which was processed as a chip. The chip samples (12 tubers/clone; 1 chip per tuber) were rinsed with water and fried in 375°F vegetable oil for 2 minutes. The chips were drained on paper towels and chip color was graded using the potato chip Snack Food Association (SFA) color chart (1 = light, 5 = dark).

Late Harvest

Testing of clones in the late harvest trials involved the following postharvest quality evaluations. As soon as possible after harvest, tuber specific gravity and fry color (Photovolt readings) were measured on 12 tubers from each clone. Clones designated as fresh processing were French fried and Photovolt readings compared at harvest only. Additional tubers of each clone were placed in storage at 40, 44 and 48°F. Tubers stored at 48°F were evaluated for bruise potential, soft rot susceptibility, consumer acceptance of French fries, and cooking time in October and November. Reducing sugar content and French fry color were assessed in early December. The extent of sprouting was recorded in late December. Tubers stored at 44°F were also evaluated for sugar accumulation in December. Storage of tubers at 40°F until mid December was done to determine the “cold-frying” potential of clones. Fry color was assessed as described below.

Statistical Analysis

Least significant difference (LSD) values are included in the tables to facilitate evaluation of differences in fry color (Photovolt readings), specific gravity, taste panel ratings, bruise, soft rot, and sprouting. Any two means whose difference is greater than or equal to the LSD value are significantly different.

Evaluation of Rated Characteristics

Specific gravity - was measured on a 12-tuber sample from each clone prior to storage by the weight-in-air/weight-in-water method and values were transformed into a 5-point scale as shown below. These same tubers were then used for French fry quality evaluation.

5 = 1.083–1.088
4 = 1.081–1.082 and 1.089–1.091
3 = 1.080 and 1.092–1.093
2 = 1.078–1.079 and 1.094–1.095
1 = 1.076–1.077 and 1.096 or higher
0 = 1.075 or lower

Tuber shape - The lengths and widths of up to twenty five 8- to 10-ounce tubers from each clone were measured and length:width (L/W) ratios reported. This was done to reveal the effects (if any) of growing location on tuber shape and to estimate the yield (% by number) of ≥ 3 -inch long fries for each clone. Fry yields were calculated based on algorithms relating tuber shape (L/W) to the number and weight of fries. The following table reflects these relationships.

Visual Shape	Tuber L/W ratio	Percentage of French Fries (≥ 3 in.) (by weight)	(by number)
Round	1.00	53.9	35.2
	1.25	70.3	51.6
Blocky	1.50	82.6	64.1
	1.75	90.8	72.8
	2.00	95.0	77.6
Elongated	2.25	95.1	78.5

A L/W ratio close to one indicates a round tuber which is not ideally suited for French fry production. A ratio in the 1.5-1.8 range represents an oblong, blocky tuber, which is more desirable for processing. A typical L/W ratio for Russet Burbank is about 1.80. A schematic illustrating the relative sizes of potatoes having various ratios is included in the postharvest sections for the Tri-State and Regional Trials. Blocky and elongated tubers result in high French fry yield with less waste. Length to width ratios were transformed into a 5-point rating scale as shown below:

5 = 1.8 L/W and above
4 = 1.65-1.79 L/W
3 = 1.5-1.64 L/W
2 = 1.35-1.49 L/W
1 = 1.2-1.34 L/W
0 = Less than 1.2 L/W

French fries - were processed by frying tuber slices (3/8" x 1 1/8" x length of tuber) in 375°F oil for 3.5 minutes. Fry color was measured with a Photovolt meter within 3 minutes of frying. A Photovolt reading of 19 or less was considered unacceptably dark. The stem and bud end Photovolt readings were reported along with the USDA color class (see below). A difference of 9 Photovolt units or more between bud and stem end constitutes non-uniform fry color. A point was either added or subtracted from the total score, based on the uniformity of fry color. A (+) or (-) symbol is included with the Photovolt ratings to indicate that a point has been added or subtracted during tabulation of the total score. The USDA color classes assigned to French fries were based upon Photovolt readings of the darkest ends (usually the stem end) and are for information only; they were not used in determining the final rating.

<u>Photovolt</u>	<u>USDA color</u>	<u>Rating</u>	<u>Photovolt reading</u>
>31	0	5	= 41 or higher
25-30	1	4	= 36 thru 40
20-24	2	3	= 31 thru 35
15-19	3	2	= 25 thru 30
<14	4	1	= 20 thru 24
		0	= 19 or less

Taste panels - were used to determine the consumer acceptance of French fries prepared from tubers of each clone. All of the clones evaluated by the taste panels were produced through classical breeding techniques. Slices (3/8" x 3/8" x length of tuber) from tubers stored at 48°F were fried in 375°F oil for 4.5 minutes. Approximately 12 untrained panelists rated the fries on a 1 to 5 (5=best) scale for taste, texture, internal flesh color, and weak units (limpness). The average rating of the four fry characteristics is reported and was used in calculating the total rating score for each clone.

Calculation of Total Score - The overall postharvest rating for each clone is equal to the sum of the individual ratings for each of the following quality characteristics:

Quality Parameter	Maximum Rating*
Fry color prior to storage (0-5 $\pm$ 1 uniformity)	6**
Specific gravity (0-5)	5
Length to Width Ratio (0-5)	5
Taste panel (avg of 5 pts for taste, texture, internal flesh color and limpness of cooked fries) (1-5)	5
Fry color after 60 days storage at:	
48°F fry color (0-5 $\pm$ 1 uniformity)	6**
44°F fry color (0-5 $\pm$ 1 uniformity)	6**
40°F fry color (0-5)	5
Postharvest rating =	38

*All characteristics are rated from 0-5 or 1-5 as indicated. A rating of 5 is best. **Uniformity of color from bud to stem end is also evaluated. The fry color ratings of samples prior to storage and after 60 days at 44 and 48°F will gain or lose a point, depending on uniformity. For example, if the difference between stem and bud end fry color is <9 photovolt reflectance units, indicating highly uniform fry color, a point is added to determine the overall score. On the other hand, if the difference between stem and bud end fry color is $\geq$ 9 photovolt reflectance units (non-uniform fry color), a point is subtracted to end up with the final score. Hence, a clone can receive a maximum of 38 points.

Evaluations of Non-Rated Characteristics

Reducing sugars - concentrations in tuber stem and bud ends were determined on a percent dry weight basis. Reducing sugars were assayed spectrophotometrically or were estimated based on fry color in tubers stored at 44° and 48°F.

Bruise potential and severity - For each clone, 12 tubers were warmed to room temperature for one day. Each tuber was then held under a device that dropped a 4-ounce weight from a height of 23 inches. Each tuber received four such impacts, two on the stem end and two on the bud end. After 24 hours, the tubers were peeled and the percentage of impacts resulting in a blackspot or shatter bruise was calculated. In addition, the severity of bruise was also rated on a 1-5 scale as indicated below. Bruises that rated 3, 4, or 5 were used in the overall percentage calculation.

Bruise Severity Ratings:

- 1 = No bruise
- 2 = White knot bruise
- 3 = Less than 50% of the impact area darkened
- 4 = Greater than 50% of the impact area darkened, or the whole impact area is light brown
- 5 = 100% of the impact area is dark

Soft rot index - Bacterial soft rot susceptibility was determined by wounding the stem and bud ends of room-temperature tubers, inoculating the wounds with *Pectobacterium carotovorum* subsp. *carotovorum*, and incubating the tubers (6 tubers per clone) for 24 hours at 72°F in a mist chamber. The percentage fresh weight of tissue lost due to rot is reported.

Reconditioning potential - Reconditioning ability of tubers stored at 40°F for approximately 60 days was determined by subsequently storing the tubers at 60°F for 21 days. The change in fry color over the reconditioning interval provides a relative measure of the reconditioning potential for each clone.

Blanching potential - Blanching ability of tubers stored at 40°F for approximately 60 days was determined by placing center-cut potato strips into a water bath of 160°F for 10 min. Strips were then rinsed with fresh water and fried. The change in fry color from the non blanched sample shows the relative potential to leach sugars to recover fry color.

Sprouting - The degree of sprout development in tubers stored at 40 and 48°F was assessed after all other tests had been completed (usually late December). The percentage of tubers that sprouted and the average sprout length per tuber were recorded for 15 tubers of each clone.

Long-term Storage Characteristics of Clones in the Tri-State and Regional Variety Trials

For evaluation of long-term storability, tubers were held at 48°F until late December and then transferred to 44°F. The tubers were processed into French fries, and reducing sugars were measured in late April or early May of the following year. Tubers were not reconditioned prior to frying. Results from clones that were advanced from the Tri-State to the Regional Trial are reported in the Regional Trial section.

2021 Early Harvest Tri-State Trial

Location: WSU Research Center – Othello, WA

Planting Date: March 31

Vine Kill Date: July 26

Harvest Date: August 9

Days Grown: 117

The Tri-State trial is conducted annually in Washington, Idaho, and Oregon. The Tri-State committee designates which clones are entered in the trial. Selected cultivars and clones in the early trial are grown and managed for an early harvest (July/Aug). The 2021 trial compared 5 local reference varieties to 12 new clones. The following is a summary of the Washington field and post-harvest results. See also: grading comments and merit scores near front of book.

Fresh Market Standout(s): AOR11217-3 and Russet Norkotah

Process Market Standout(s): AOR11217-3 and A12305-2adg

Yield and Economic Data

➤ Total Yield and U.S. #1 Yield

Highest: A11259-1 had the highest total yield (665 CWT/A) and the third highest U.S. #1 yield (494 CWT/A). A12305-2adg had the second highest total yield (665 CWT/A) and the highest U.S. #1 yield (518 CWT/A).

Lowest: A11326-1 had the lowest total yield (477 CWT/A). Shepody had the second lowest total yield (506 CWT/A) and the lowest U.S. #1 yield (221 CWT/A).

➤ % U.S. #1's (greater than 4 oz)

Highest: A10594-4sto (88%) and AOR13064-2 (86%).

Lowest: Shepody (44%) and Russet Burbank (47%).

➤ Carton Yield (100 to 50 Count (7 to 18 oz U.S. #1 Tubers))

Highest: AOR13064-2 (16.0 Tons/A), A10130-1 and A10594-4sto (15.7 Tons/A).

Lowest: Shepody (4.4 Tons/A).

➤ Gross Return (\$/acre)

Fresh Market Highest: AOR13064-2 and A09136-9LB.

Fresh Market Lowest: Shepody, A11326-1, and Russet Burbank.

Process Market Highest: A12305-2adg, A09136-9LB, and A10594-4sto.

Process Market Lowest: Shepody, Russet Burbank, and A11326-1.

2021 Early Harvest Tri-State Trial

Summaries

ENTRY	TOTAL YIELD						CARTON YIELD		PROCESS YIELD	
				US # 1's*	US # 2's*	Culls*	100-50 count		US 1's and 2's	
	CWT/A	STATS**	Tons/A	> 4 oz % of Total Yield	> 4 oz % of Total Yield	& < 4 oz % of Total Yield	(US 1's 7-18 oz) % of Total Yield	Tons/A	> 6 oz % of Total Yield	Tons/A
Clearwater Russet	527	AB	26.3	73	2	25	41	7.8	42	11.1
Ranger Russet	640	AB	32.0	75	12	13	52	12.5	61	19.7
Russet Burbank	582	AB	29.1	47	17	36	54	7.3	45	13.2
Russet Norkotah	574	AB	28.7	82	3	15	55	12.9	60	17.3
Shepody	506	AB	25.3	44	26	30	39	4.4	45	11.3
A09086-1LB	606	AB	30.3	74	0	25	37	8.2	42	12.8
A09136-9LB	606	AB	30.3	79	6	15	64	15.4	68	20.7
A10130-1	538	AB	26.9	84	3	12	69	15.7	76	20.4
A10594-4sto	564	AB	28.2	88	1	10	63	15.7	70	19.8
A11175-12TE	607	AB	30.4	73	2	25	31	6.9	41	12.3
A11259-1	665	A	33.3	70	12	19	49	11.3	56	18.6
A11326-1	477	B	23.9	68	2	30	40	6.6	43	10.3
A12114-7	544	AB	27.2	77	2	21	39	8.1	50	13.5
A12305-2adg	648	A	32.4	80	2	18	55	14.3	62	20.3
AFA5661-8	540	AB	27.0	83	0	17	63	14.2	64	17.3
AOR11217-3	607	AB	30.3	81	1	17	47	11.7	53	16.0
AOR13064-2	573	AB	28.7	86	3	11	65	16.0	70	20.1

ENTRY	US # 1 YIELD						> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%)		
				> 4 oz	4-7 oz*	7-14 oz*		(8-12 oz tubers)		
	CWT/A	STATS**	Tons/A	> 4 oz %	4-7 oz* %	7-14 oz* %		% HH	% BC	% IBS
Clearwater Russet	384	ABC	19.2	59	40	1	1.075	0	0	0
Ranger Russet	478	A	23.9	48	51	1	1.078	0	0	0
Russet Burbank	273	CD	13.6	46	51	2	1.075	0	10	0
Russet Norkotah	471	AB	23.6	44	50	6	1.073	0	0	0
Shepody	221	D	11.0	61	39	0	1.071	0	0	0
A09086-1LB	451	AB	22.5	63	37	0	1.082	0	0	0
A09136-9LB	480	A	24.0	34	63	3	1.114	0	0	0
A10130-1	454	AB	22.7	28	59	13	1.071	0	0	3
A10594-4sto	498	A	24.9	37	62	1	1.102	0	0	3
A11175-12TE	445	AB	22.3	69	31	0	1.077	0	0	0
A11259-1	464	AB	23.2	50	46	4	1.075	0	0	10
A11326-1	326	BCD	16.3	60	40	0	1.084	3	0	0
A12114-7	416	ABC	20.8	61	39	0	1.081	0	0	0
A12305-2adg	518	A	25.9	45	55	0	1.081	0	0	0
AFA5661-8	449	AB	22.4	37	60	3	1.074	0	0	0
AOR11217-3	494	A	24.7	53	46	1	1.082	0	0	0
AOR13064-2	490	A	24.5	33	56	11	1.080	0	0	0

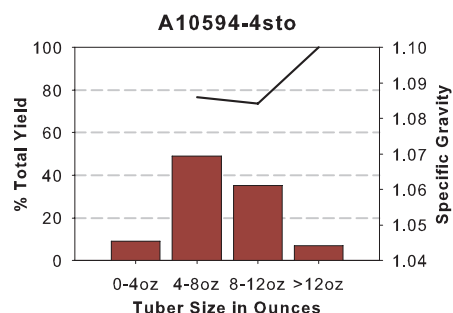
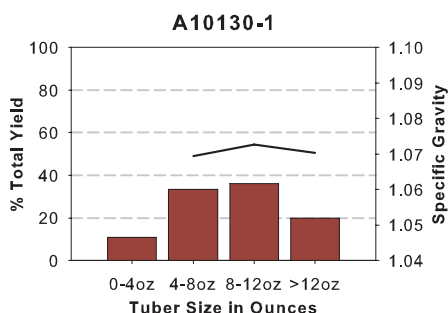
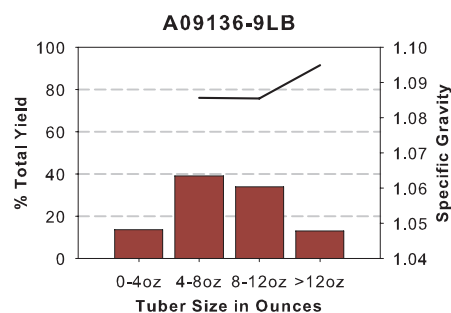
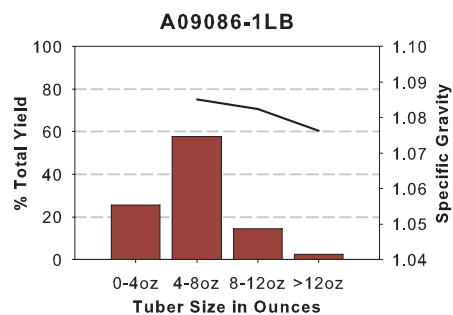
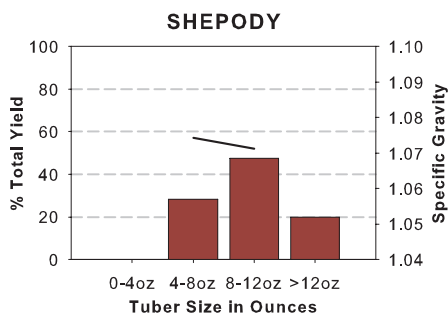
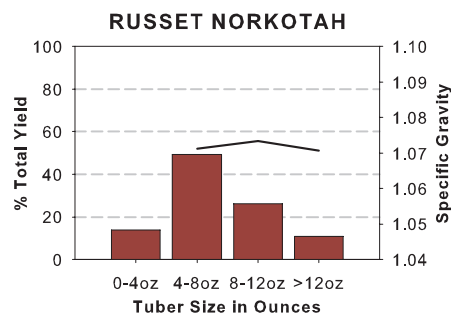
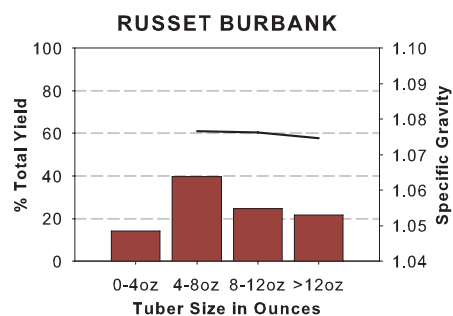
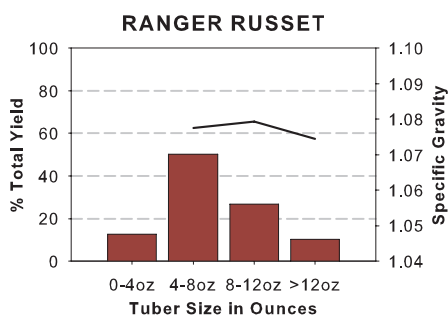
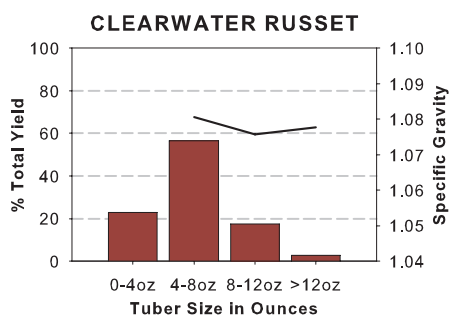
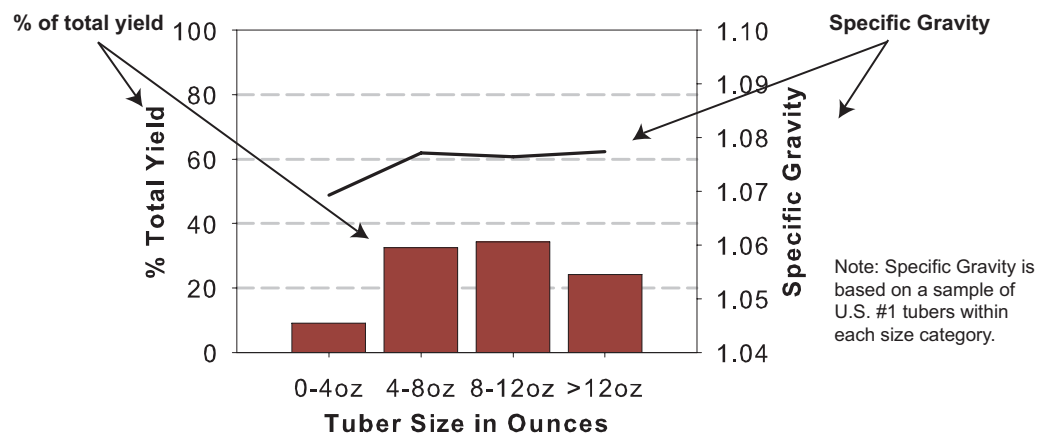
ENTRY	40 DAY STAND	50 DAY STAND	TUBER GREENING	STEMS PER PLANT	AVERAGE TUBER		SKIN SET	TUBER SHAPE	BRUISE (%)	
	% Emerged	% Emerged	% Total Yield	Above Ground	WEIGHT	NUMBER	1 = Poor 5 = Good	1 = Round 5 = Long	(8-12 oz tubers)	
					Ounces	Tubers/Plant			BLACKSPOT	SHATTER
Clearwater Russet	16	93	3	2.3	4.9	10.5	3.0	3.0	3	3
Ranger Russet	100	100	0	2.5	5.9	10.7	3.0	4.0	3	0
Russet Burbank	69	100	0	1.8	6.2	9.1	2.7	4.0	0	0
Russet Norkotah	58	98	5	2.6	5.8	9.8	3.7	4.0	0	0
Shepody	31	98	4	2.3	4.5	10.9	3.7	5.0	3	10
A09086-1LB	56	100	0	2.9	4.6	12.9	3.0	3.3	3	30
A09136-9LB	78	100	0	2.7	6.2	9.5	3.3	2.7	3	37
A10130-1	33	100	2	2.2	6.7	7.9	3.7	3.0	3	7
A10594-4sto	49	100	0	1.6	6.5	8.5	3.7	3.0	0	7
A11175-12TE	73	100	1	3.3	4.6	12.9	3.3	2.7	0	3
A11259-1	82	100	1	3.6	5.4	12.0	2.7	3.0	0	7
A11326-1	60	98	2	2.7	4.5	10.6	2.0	3.0	3	17
A12114-7	22	98	0	3.1	5.0	10.8	3.7	2.0	0	17
A12305-2adg	29	100	7	2.1	6.2	10.2	2.3	3.0	0	0
AFA5661-8	2	96	5	1.8	6.6	8.0	3.0	4.0	0	4
AOR11217-3	49	100	2	2.3	5.6	10.7	3.0	4.0	3	7
AOR13064-2	80	100	6	2.8	7.1	8.0	3.0	4.0	7	20

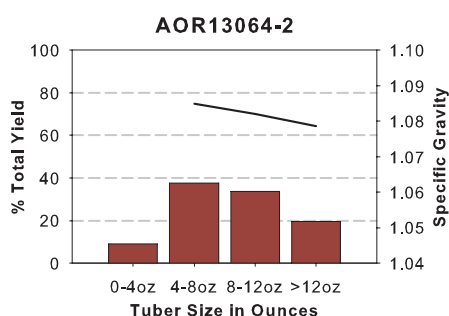
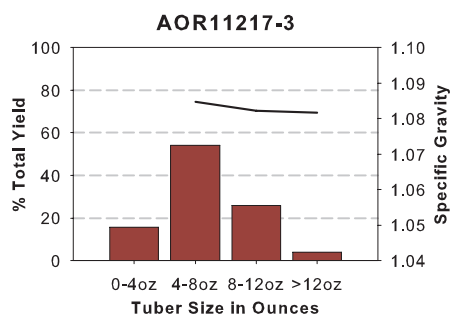
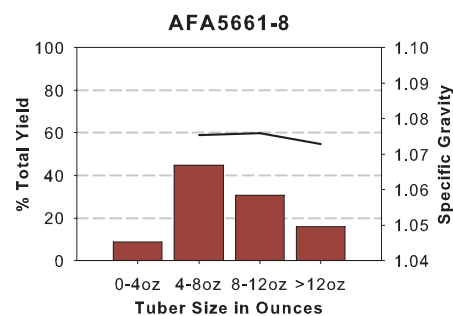
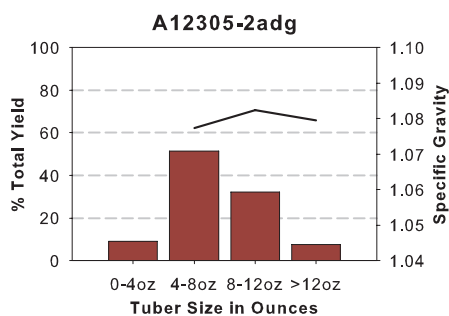
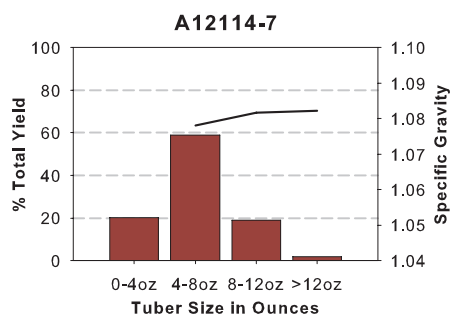
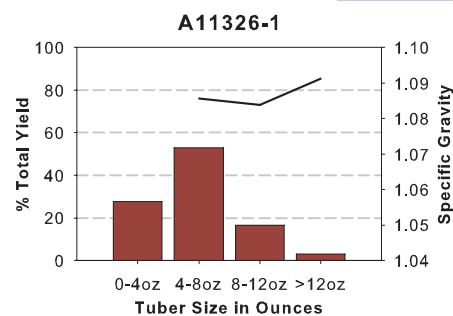
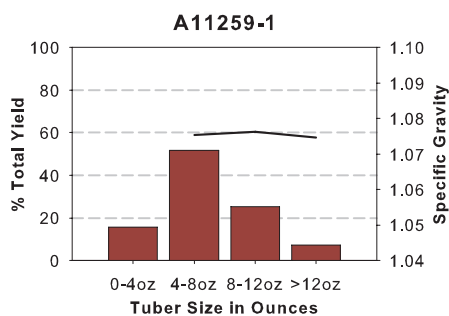
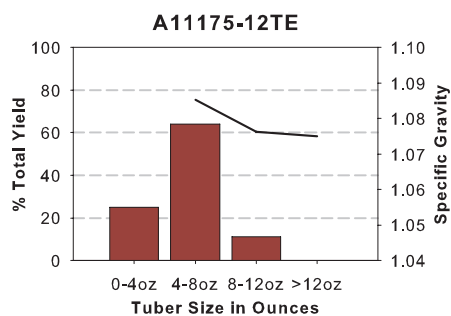
* Percent values may not total 100% due to rounding

2021 Early Harvest Tri-State Trial

Tuber Yield and Specific Gravity Distributions

12 inch In-Row Spacing





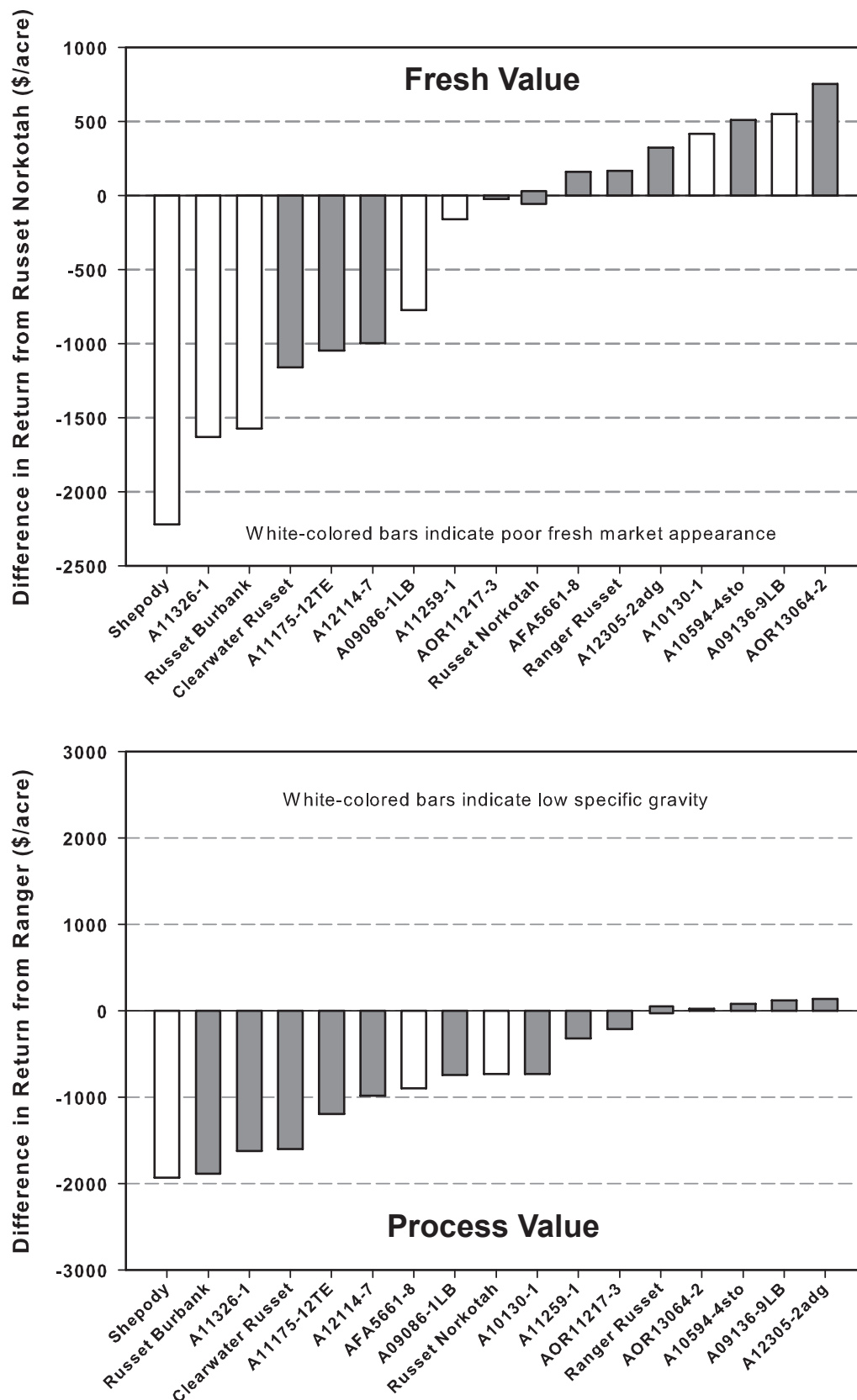


Figure 1 (top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry.

Figure 2 (bottom). Difference in gross return per acre (Process Market) from Ranger Russet calculated by subtracting the gross return of Ranger Russet from the gross return of the particular entry. Entries with the white-colored bars would be penalized due to a low specific gravity.

2021 Early Harvest Tri-State Trial

Tubers

Clearwater Russet



Ranger Russet



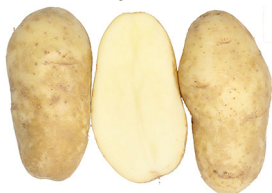
Russet Burbank



Russet Norkotah



Shepody



A09086-1LB



A09136-9LB



A10130-1



A10594-4sto



A11175-12TE



A11259-1



A11326-1



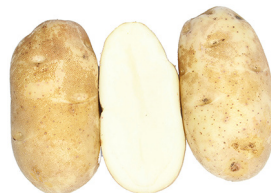
A12114-7



A12305-2adg



AFA5661-8



AOR11217-3



AOR13064-2



2021 Late Harvest Tri-State Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 4

Vine Kill Date: August 30

Harvest Date: September 13

Days Grown: 148

The Tri-State trial is a part of the cooperative cultivar development program conducted at locations in Washington, Oregon, and Idaho. The Tri-State committee selects all official entries in this trial. All entries are grown for full season late harvest in each of the three states to determine how they perform when grown under different management and climatic conditions. The following is a summary of the Washington field and post harvest results. See also: grading comments and merit scores near front of the book.

Fresh Market Standout(s): Russet Norkotah

Process Market Standout(s): AOR11217-3

Yield and Economic Data

➤ Total Yield and U.S. #1 Yield

Highest: A09086-1LB had the highest total yield (1164 CWT/A) and the highest U.S. #1 yield (914 CWT/A). A12305-2adg had the second highest total yield (1108 CWT/A) and A12114-7 had the second highest U.S. #1 yield (809 CWT/A).

Lowest: Russet Norkotah had the lowest total yield (814 CWT/A). A11259-1 had the lowest U.S. #1 yield (297 CWT/A).

➤ % U.S. #1's (greater than 4 oz)

Highest: Russet Norkotah, A10594-4sto, and A11175-12TE (85%).

Lowest: A11259-1 (29%) and Russet Burbank (34%).

➤ Carton Yield (100 to 50 Count (7 to 18 oz U.S. #1 Tubers))

Highest: A09086-1LB (33.5 Tons/A), A11326-1 (29.6 Tons/A).

Lowest: A11259-1 (7.8 Tons/A) and Russet Burbank (11.5 Tons/A).

➤ Gross Return (\$/acre)

Fresh Market Highest: A09086-1LB and A11326-1.

Fresh Market Lowest: A11259-1, Russet Burbank, and A10130-1.

Process Market Highest: A09086-1LB and A11326-1.

Process Market Lowest: A11259-1, Russet Norkotah, and Russet Burbank.

2021 Late Harvest Tri-State Trial

Postharvest Information

Samples were obtained from the Washington, Idaho, and Oregon field adaptation trials for analysis in Pullman. Twelve numbered entries and three cultivars were tested from ID, WA, and OR. Postharvest performance ratings of the clones compared with Clearwater Russet, Russet Burbank, and Ranger Russet appear in the tables on pages 31 and 42 with details summarized below. An “**” in the summary below indicates similar performance and/or ranking in trials from previous years.

➤ Overall Postharvest Ratings

Highest scoring clones: AOR13064-2, A10594-4sto*, AOR11217-3*

Lowest scoring clones: A11326-1, A10130-1, Russet Burbank*

➤ Low Temperature Sweetening

Most resistant: AOR13064-2, A11175-12TE

Most susceptible: Russet Burbank*, A09086-1LB

➤ French Fry Taste Panel

Highest rated: Clearwater Russet*, AOR13064-2, A09136-9LB

Lowest rated: A12114-7, Russet Burbank*

➤ Blackspot Bruise Susceptibility

Most resistant: A11175-12TE, A11259-1

Most susceptible: Ranger Russet*, A09086-1LB

➤ Variability in Tuber Shape & Fry Yield (8- to 10-oz tubers)

Lowest L/W: A09136-9LB, A12114-7, A11326-1

Highest L/W: Russet Burbank*, Ranger Russet*, AOR13064-2, A12305-2adg

Lowest W/Th: A11259-1, AFA5661-8

Highest W/Th: Russet Burbank, A09136-9LB

Least variable: AOR11217-3

Most variable: A12114-7

Details

- AOR13064-2, A10594-4sto*, and AOR11217-3* were the highest rated entries, scoring 32.5, 28.6, and 28.5 points, respectively.
- AOR13064-2 and A11175-12TE were the most resistant to cold sweetening, with tuber samples from all states producing acceptably light-colored fries following storage for 60 days at 44 or 40°F (USDA 0 at 44°F, USDA 0 & 1 at 40°F, average of stem ends). Clearwater Russet* again identified as resistant to cold sweetening and clones; A11175-12TE*, AFA5661-8, and AOR11217-3 were equivalent to Clearwater. The latter two did not meet the criteria for resistant in 2020.
- For the WA trial, 5/12 entries stored at 48°F, 8/12 entries stored at 44°F, and 4/12 entries stored at 40°F produced non-uniform fry color (bud to stem end photovolt difference >9). For the OR trial, 2/12 entries stored at 48°F, 3/12 entries stored at 44°F, and 2/12 entries stored at 40°F produced non-uniform fry color. The top-rated entry, AOR13064-2* maintained fry color regardless of production site (WA, ID, OR) and storage temperature (48, 44, 40°F) after 60 days. A10594-4sto and AOR11217-3 maintained fry color at all temps from ID and OR, but not from WA. (They maintained fry color from all locations and temperatures in 2020).
- Retention of process quality during storage of A09086-1LB, A09136-9LB, and AFA5661-8 at 44°F (60 days) was highly variable across production sites. By contrast, growing location had the least effect on the change in fry color of A10594-4sto, Ranger Russet, and Russet Burbank following 60 days at 44°F.
- A11326-1, A10130-1, Russet Burbank* received the lowest overall postharvest scores. A11326-1 displayed an apparent physiological disorder characterized by the development of excessively dark fry color in the

OR samples at all temperatures (48, 44, 40°F) after 60 days of storage. IBS was observed in OR samples of A09136-9LB.

- Average (across states) gravities of A10130-1, Russet Burbank*, A11175-12TE, A12114-7, and A11259-1 were 1.070, 1.071, 1.073, 1.074, and 1.075, respectively; too low for frozen process contracts. The gravities of the other entries ranged from 1.080 to 1.089 when averaged across states. When averaged across the twelve entries, gravities were 1.078 (WA), 1.086 (ID), and 1.075 (OR).
- Clearwater Russet*, AOR13064-2, and A09136-9LB were the favorites in the taste panels, scoring 3.8/5 on average across growing locations (5 is best). A12114-7 and Russet Burbank* received the lowest taste panel score of 2.8 on average.
- In addition to rating overall bruise susceptibility, blackspot bruise severity was rated from 1 to 5 (max. bruise) based on color intensity and percentage of the impacted area showing color (1 = no bruise, 2 = white knot bruise, 3 = less than 50% of impact area with color, 4 = >50% of impact area darkened or whole area light brown, 5 = full impact area dark). Ranger Russet* and A09086-1LB were the most susceptible, scoring 80.6% and 83.3% bruise (stem end), respectively, in the controlled impact study. These entries also had the highest bruise severity, averaging 3.3/5. A11259-1 and A11175-12TE were the most resistant, averaging 0% and 9.7% bruise (stem end), respectively, and averaging a 1.1/5 severity rating.
- The 8- to 10-oz tubers of A09136-9LB, A12114-7, and A11326-1 had the lowest length to width ratios (avg. L/W=1.49 across states), which was lower than the average of 1.55 for the roundest entries in last year's trial. The range in L/W was 1.29 (A12114-7 from WA) to 2.20 (A12305-2adg from WA). Averaged across states, yield of 3-inch or longer French fries ranged from 79% to 91% by tuber fresh weight. A12114-7 had the greatest variation in L/W ratio; usable fry yields ranged from 72% to 91% across production sites. Additionally in 2021, the width to thickness (W/Th) ratio was measured. The average difference in W/Th was minimal (max. 0.1) among all entries and production sites. A11259-1 and AFA5661-8 had the most consistent diameter (1.12) and Russet Burbank and A09136-9LB were the least consistent (1.22).
- Reconditioning (60°F, 21 days) tubers of A09086-1LB, A11326-1, and A12114-7 that had been stored at 40°F for 60 days resulted in the greatest improvement in stem end fry color compared with the other clones. By contrast, fry color of AOR13064-2 and A10130-1 changed little in response to reconditioning and A12305-2adg were darker post reconditioning treatment. Ranger Russet and AOR11217-3 appeared more susceptible to sugar end development based on attenuated reconditioning of the stem versus bud end of tubers following storage at 40°F. Additionally in 2021, the fry color recovery was assessed by blanching potato strips prior to frying. A09136-9LB benefited the most and recovered its fry color consistent with the at harvest stem end fry color sample. Blanching had the least effect on A09086-1LB and A12114-7. When averaged for location and entry, stem end color recovery was 9% higher in blanched samples vs reconditioned samples for the Tri-State entries. Both methods were equivalent in the Regional entries.
- Following 60 days at 48°F, 97.8% of A09136-9LB tubers were sprouting with an average sprout length of 1.3 inches. On average, 82.2% of tubers of A11326-1 had sprout lengths of 0.8 inches and Ranger Russet (68.9%) and A10594-4sto (60.3%) had sprout lengths of 0.6 inches. This compares to 50.4% of Clearwater Russet tubers with 0.3-inch sprouts, 25.3% of AOR11217-3 tubers with 0.1-inch sprouts, and Russet Burbank* having no sprouting.

Overall Tri-State Postharvest Merit Scores

Clone	Postharvest Merit Scores			3 state Average
	WA	ID	OR	
15 AOR13064-2	4.0	4.7	4.1	4.3
7 A10594-4sto *	3.4	4.5	3.4	3.8
14 AOR11217-3 *	2.8	4.4	4.0	3.8
8 A11175-12TE *	3.4	4.2	3.2	3.7
5 A09136-9LB	3.1	4.3	3.4	3.6
1 Clearwater Russet	2.5	4.2	3.9	3.5
13 AFA5661-8 *	2.3	3.8	3.9	3.3
9 A11259-1	2.1	4.4	3.2	3.2
2 Ranger Russet	2.6	3.9	2.9	3.2
4 A09086-1LB	2.1	3.6	2.6	2.8
12 A12305-2adg	1.4	3.4	2.9	2.6
11 A12114-7	1.8	2.9	2.5	2.4
10 A11326-1	2.4	3.2	1.5	2.4
6 A10130-1	1.4	3.6	2.0	2.3
3 Russet Burbank	1.3	1.9	2.4	1.9

* similar results to 2020

2021 Late Harvest Tri-State Trial

Summaries

ENTRY	TOTAL YIELD						CARTON YIELD		PROCESS YIELD	
	CWT/A	STATS**	Tons/A	US # 1's*	US # 2's*	Culls*	100-50 count		US 1's and 2's	
				> 4 oz	> 4 oz	& < 4 oz	(US 1's 7-18 oz)		> 6 oz	
				% of Total Yield			% of Total Yield	Tons/A	% of Total Yield	Tons/A
Clearwater Russet	966	ABC	48.3	83	8	9	53	25.4	75	36.3
Ranger Russet	1047	AB	52.4	44	41	15	28	14.5	74	39.2
Russet Burbank	1049	AB	52.5	34	43	23	22	11.5	70	36.9
Russet Norkotah	814	C	40.7	85	4	11	59	24.0	76	30.9
A09086-1LB	1164	A	58.2	78	11	11	58	33.5	79	45.9
A09136-9LB	980	ABC	49.0	79	10	11	47	23.0	82	40.3
A10130-1	1048	AB	52.4	48	33	18	29	15.1	76	39.7
A10594-4sto	916	BC	45.8	85	5	10	61	27.7	84	38.7
A11175-12TE	905	BC	45.2	85	5	10	58	26.5	73	32.9
A11259-1	1005	ABC	50.3	29	29	42	16	7.8	46	23.5
A11326-1	1054	AB	52.7	75	14	11	56	29.6	81	42.8
A12114-7	976	ABC	48.8	83	5	12	57	27.6	73	35.4
A12305-2adg	1108	AB	55.4	56	34	10	38	21.1	85	47.1
AFA5661-8	1055	AB	52.7	53	30	17	37	19.5	80	42.5
AOR11217-3	965	ABC	48.3	82	10	8	53	25.5	80	39.0
AOR13064-2	962	ABC	48.1	81	12	7	48	23.0	84	40.3

ENTRY	US # 1 YIELD						> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%)		
	> 4 oz CWT/A	STATS**	Tons/A	> 4 oz	4-7 oz*	7-14 oz*		(8-12 oz tubers)		
								% HH	% BC	% IBS
Clearwater Russet	806	AB	40.3	29	53	18	1.078	0	0	3
Ranger Russet	468	DEF	23.4	31	55	14	1.078	0	0	4
Russet Burbank	356	EF	17.8	29	52	18	1.071	0	10	0
Russet Norkotah	694	ABCD	34.7	28	62	10	1.067	0	0	0
A09086-1LB	914	A	45.7	21	60	19	1.086	0	0	0
A09136-9LB	771	ABC	38.6	14	43	44	1.080	7	0	3
A10130-1	507	DEF	25.4	17	42	42	1.061	0	0	0
A10594-4sto	779	ABC	39.0	11	48	42	1.080	0	3	5
A11175-12TE	769	ABC	38.4	30	62	7	1.068	0	0	3
A11259-1	297	F	14.9	47	47	6	1.070	0	0	0
A11326-1	791	AB	39.6	15	59	25	1.084	5	10	5
A12114-7	809	AB	40.5	30	59	11	1.076	0	0	0
A12305-2adg	621	BCD	31.1	12	42	46	1.076	0	0	0
AFA5661-8	558	CDE	27.9	8	41	51	1.080	0	0	0
AOR11217-3	791	AB	39.5	21	49	31	1.080	0	0	0
AOR13064-2	775	ABC	38.8	16	44	39	1.079	0	0	0

ENTRY	40 DAY	50 DAY	STEMS PER	TUBER	AVERAGE TUBER		SKIN	TUBER	BRUISE (%)	
	STAND	STAND	PLANT	GREENING	WEIGHT	NUMBER	SET	SHAPE	(8-12 oz tubers)	
	% Emerged	% Emerged	Above Ground	% Total Yield	Ounces	Tubers/Plant	1 = Poor 5 = Good	1 = Round 5 = Long	BLACKSPOT	SHATTER
Clearwater Russet	66	97	2.3	1	7.5	11.6	3.0	3.0	0	44
Ranger Russet	98	98	2.7	1	8.3	11.2	3.0	4.0	0	27
Russet Burbank	75	95	2.0	3	9.1	10.4	3.0	4.0	13	37
Russet Norkotah	94	95	2.3	3	7.1	10.4	3.8	3.0	0	13
A09086-1LB	64	94	3.0	3	7.9	13.3	3.3	3.0	5	60
A09136-9LB	95	98	3.1	2	9.2	9.6	3.8	2.0	3	80
A10130-1	56	95	2.0	3	10.3	9.1	3.0	3.3	13	63
A10594-4sto	66	94	1.7	4	10.0	8.3	3.3	3.0	10	21
A11175-12TE	89	98	3.0	1	6.7	12.1	3.5	2.0	3	38
A11259-1	84	100	3.3	2	7.2	12.5	3.0	4.0	0	43
A11326-1	81	95	3.2	3	8.1	11.8	2.5	3.0	0	55
A12114-7	28	98	2.4	1	6.7	13.0	4.0	1.8	0	59
A12305-2adg	33	89	2.1	4	10.4	9.6	1.8	3.8	0	30
AFA5661-8	19	95	1.9	5	12.4	7.7	3.0	3.0	0	50
AOR11217-3	63	94	2.5	1	8.5	10.3	3.3	3.3	0	63
AOR13064-2	88	94	2.5	2	10.0	8.7	3.5	3.0	0	40

* Percent values may not total 100% due to rounding

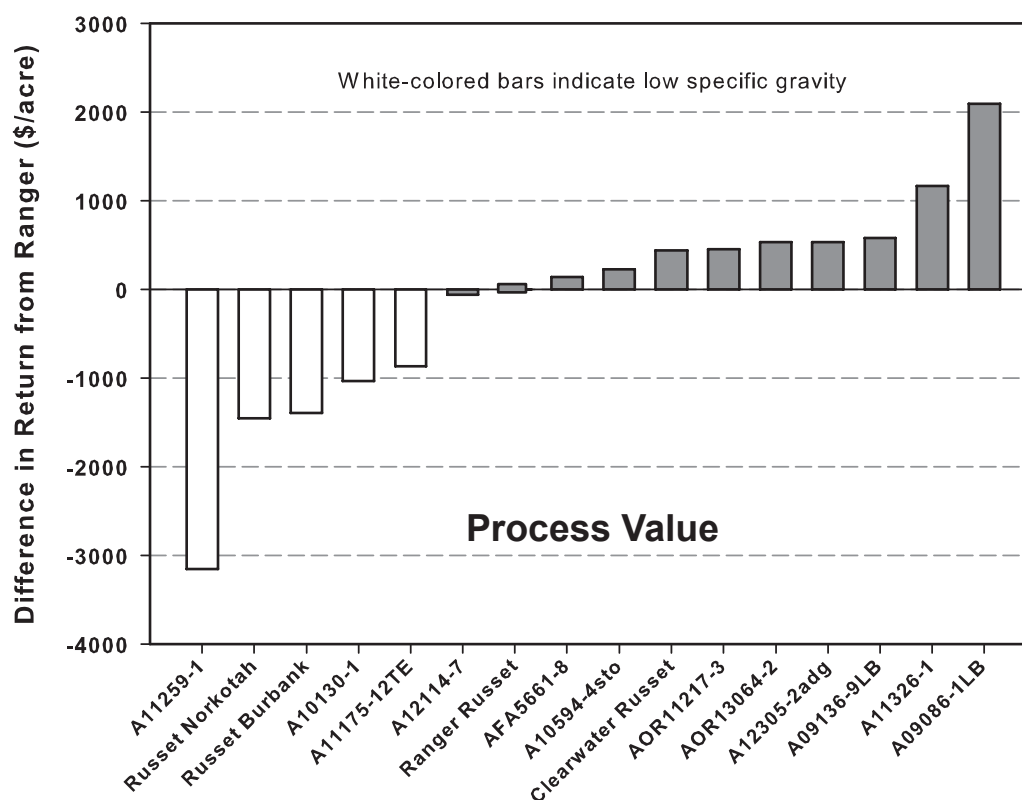
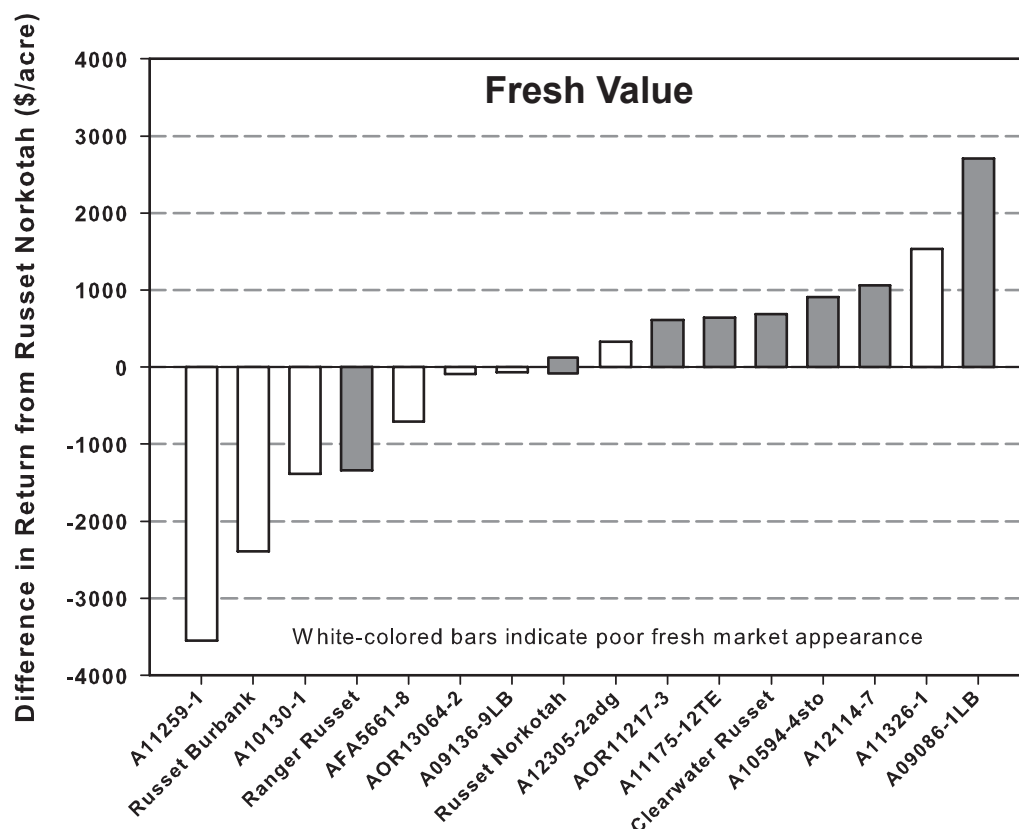
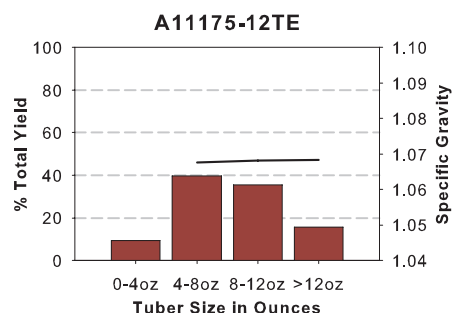
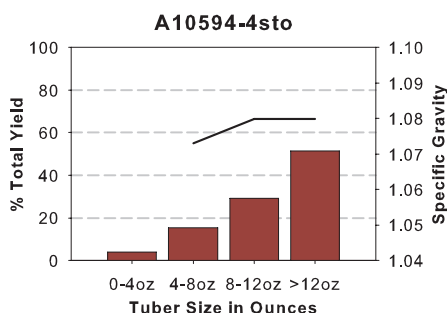
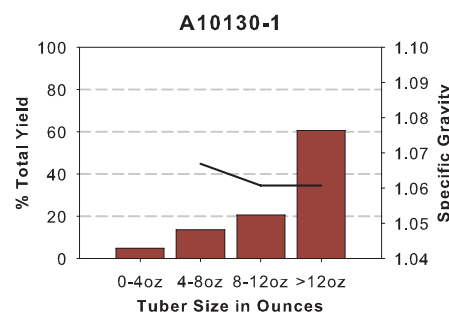
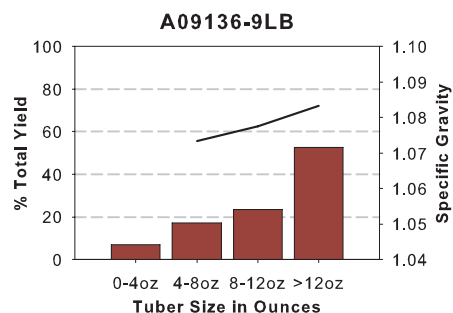
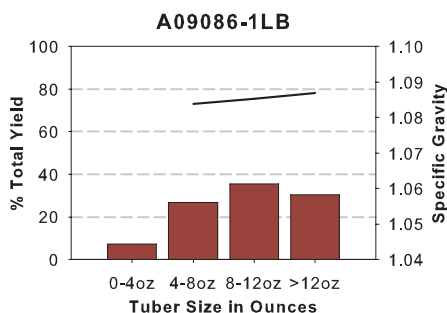
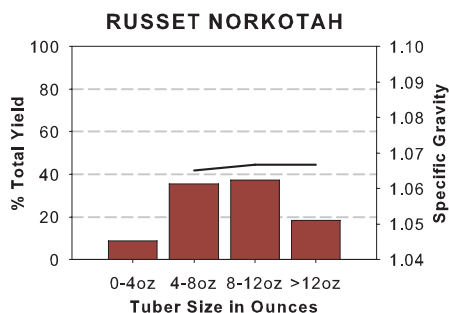
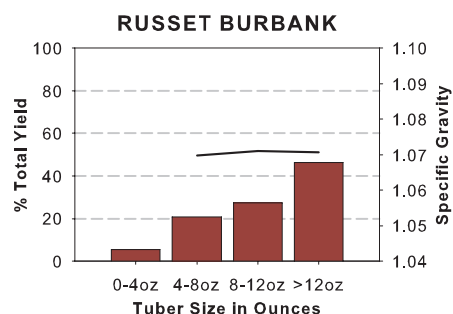
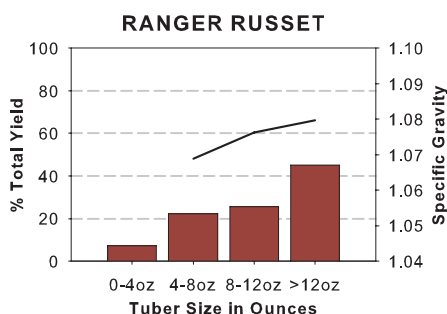
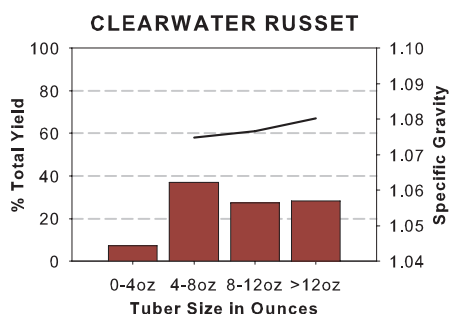
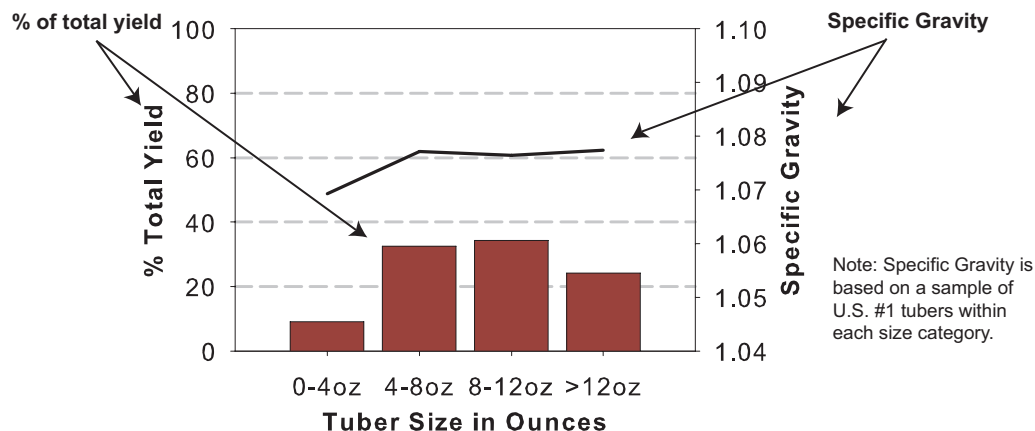


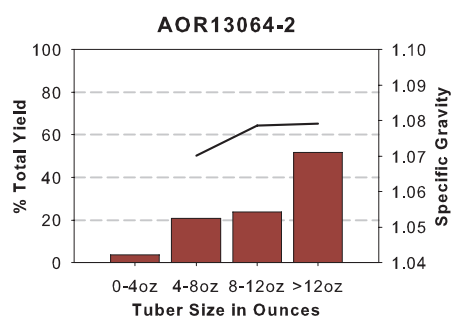
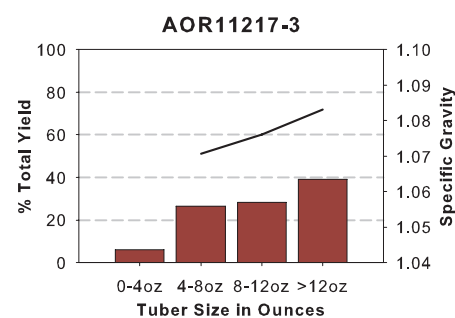
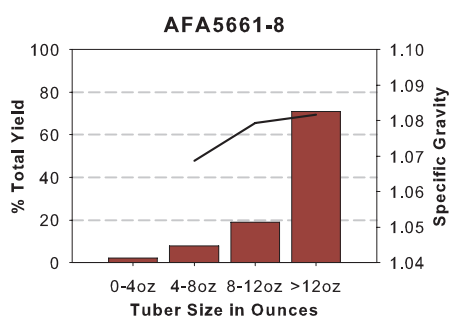
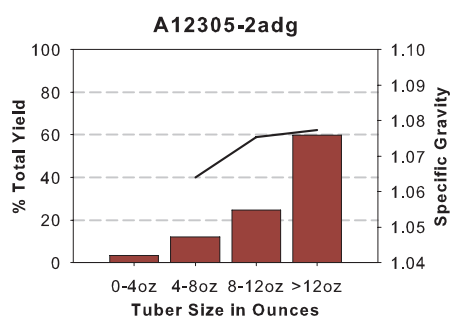
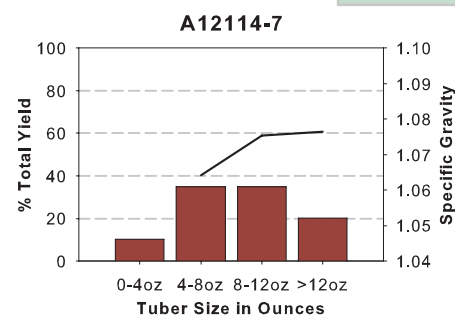
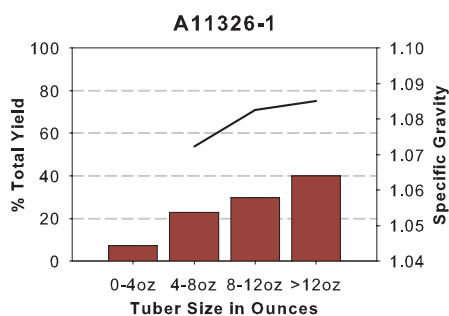
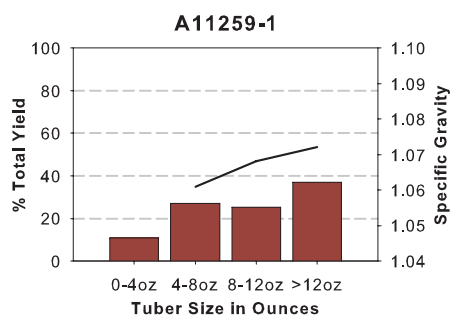
Figure 1 (top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to undesirable shape or appearance. **Figure 2 (bottom).** Difference in gross return per acre (Process Market) from Ranger Russet calculated by subtracting the gross return of Ranger Russet from the gross return of the particular entry. Entries with the white-colored bars would be penalized (under the mock contract parameters) due to a specific gravity less than 1.075.

2021 Late Harvest Tri-State Trial

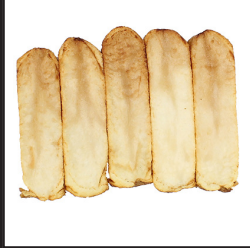
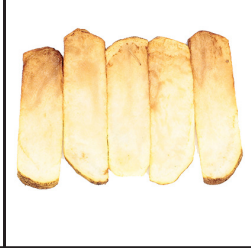
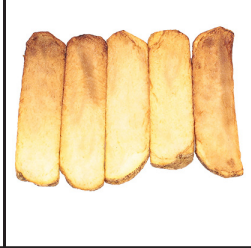
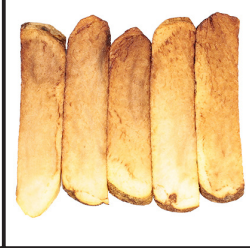
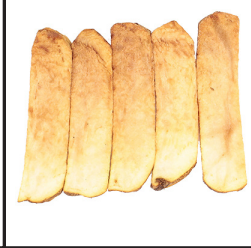
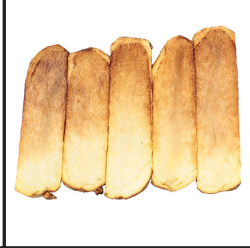
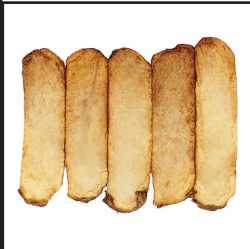
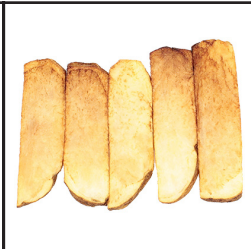
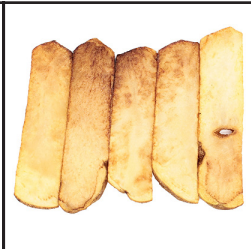
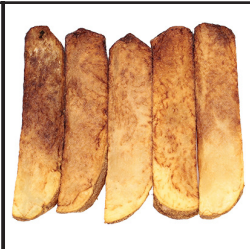
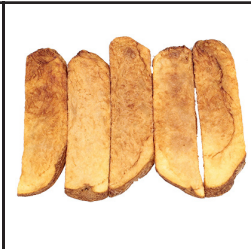
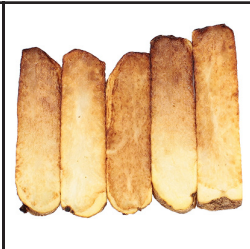
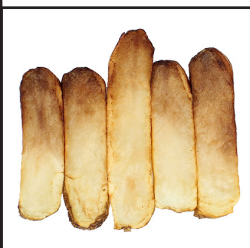
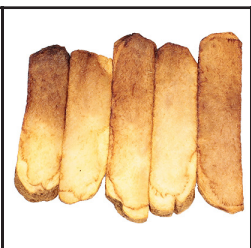
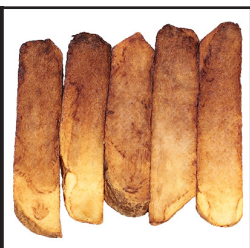
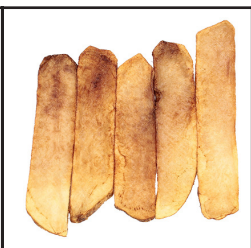
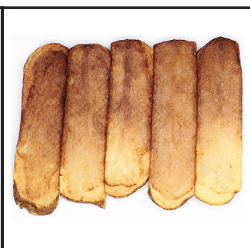
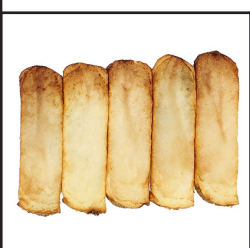
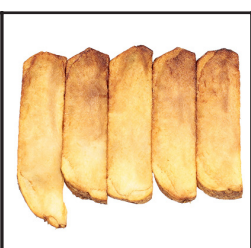
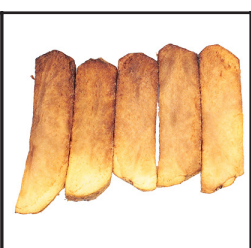
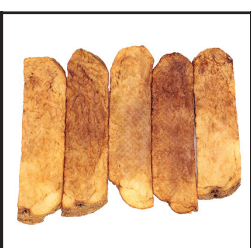
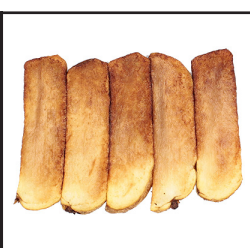
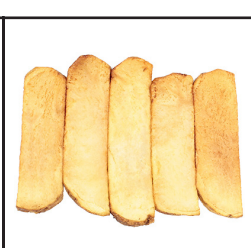
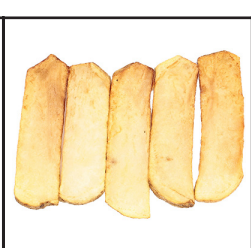
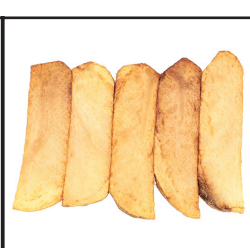
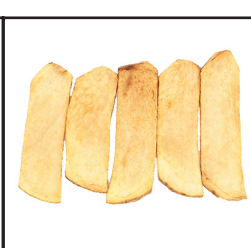
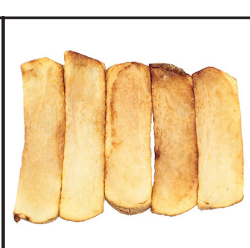
Tuber Yield and Specific Gravity Distributions

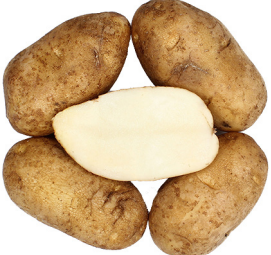
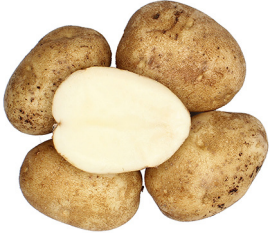
11 inch In-Row Spacing

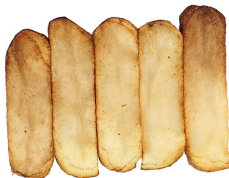
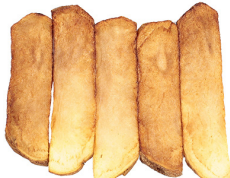
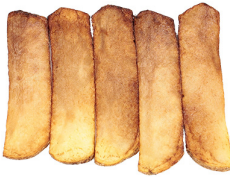
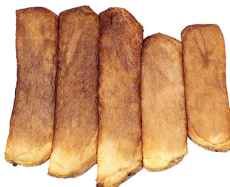
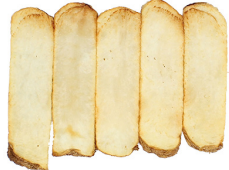
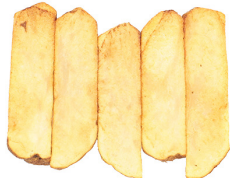
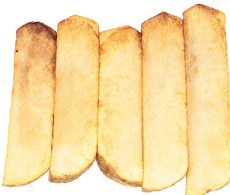
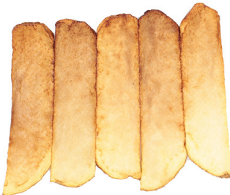
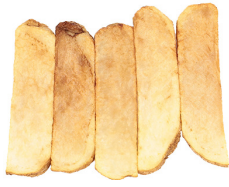
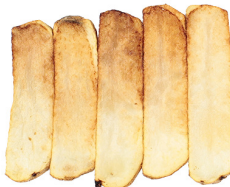
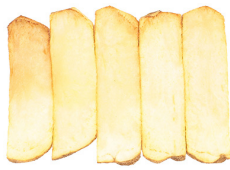
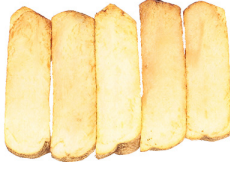
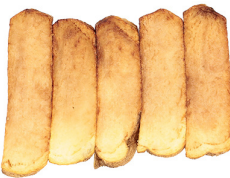
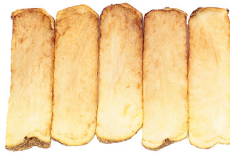
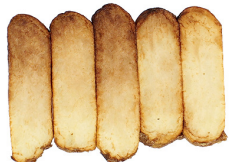
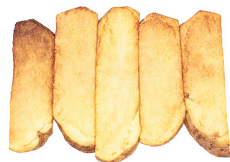
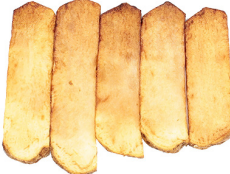
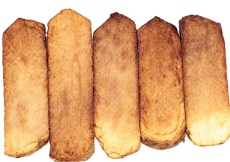
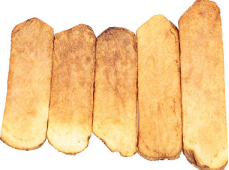
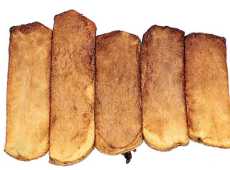
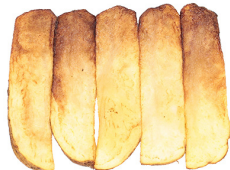
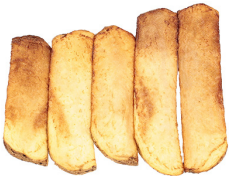
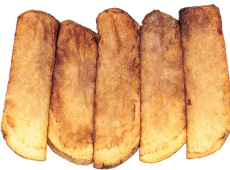


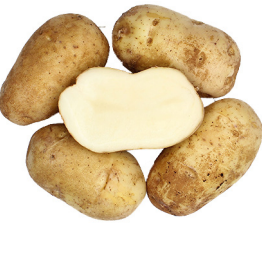


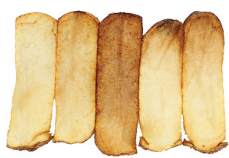
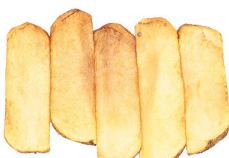
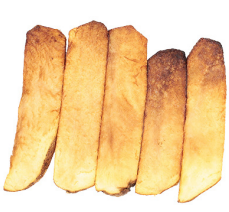
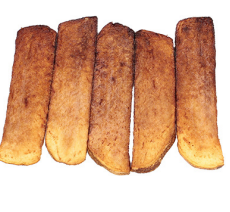
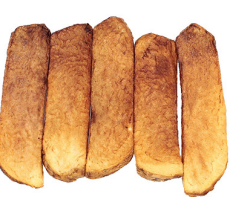
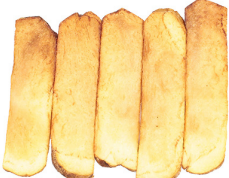
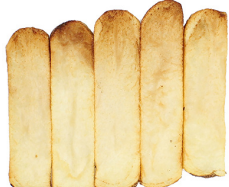
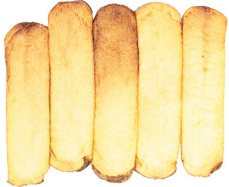
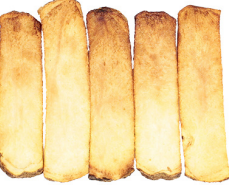
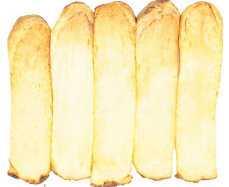
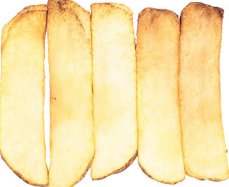
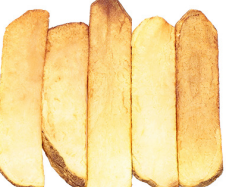
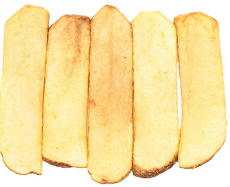
Tubers	WA Late Harvest Tri-State Trial Comments
Clearwater Russet	
	Tubers: Oblong tubers. Fair skin set; shallow eyes. Fry color: At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform; Blanched = light, non-uniform.
Ranger Russet	
	Tubers: Oblong to long tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = relatively dark, non-uniform; 40°F = unacceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, uniform.
Russet Burbank	
	Tubers: Oblong to long tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = relatively dark, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unacceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, non-uniform.
A09086-1LB	
	Tubers: Oblong tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = relatively dark, uniform; 44°F = relatively dark, non-uniform; 40°F = unacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = unacceptably dark, uniform.
A09136-9LB	
	Tubers: Round to oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, uniform; 40°F = relatively dark, uniform; Reconditioned = light, uniform; Blanched = light, uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Blanching	40° F Recon.
Clearwater Russet					
					
Ranger Russet					
					
Russet Burbank					
					
A09086-1LB					
					
A09136-9LB					
					

Tubers	WA Late Harvest Tri-State Trial Comments
A10130-1	
	Tubers: Oblong tubers. Fair skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = relatively dark, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, uniform; Blanched = relatively dark, uniform.
A10594-4sto	
	Tubers: Oblong tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform; Blanched = light, uniform.
A11175-12TE	
	Tubers: Round to oblong tubers. Good skin set; moderately deep eyes. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform; Blanched = light, uniform.
A11259-1	
	Tubers: Oblong to long tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = light, uniform; 44°F = relatively dark, uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, uniform; Blanched = relatively dark, uniform.
A11326-1	
	Tubers: Oblong tubers. Fair skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = relatively dark, non-uniform; 44°F = relatively dark, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform; Blanched = relatively dark, non-uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Blanching	40° F Recon.
A10130-1					
					
A10594-4sto					
					
A11175-12TE					
					
A11259-1					
					
A11326-1					
					

Tubers	WA Late Harvest Tri-State Trial Comments
A12114-7	
	Tubers: Round to oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = unnacceptably dark, uniform.
A12305-2adg	
	Tubers: Oblong to long tubers. Poor skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = relatively dark, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = unnacceptably dark, non-uniform.
AFA5661-8	
	Tubers: Oblong tubers. Fair skin set; shallow eyes. Fry color: At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, non-uniform.
AOR11217-3	
	Tubers: Oblong tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, uniform.
AOR13064-2	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, uniform; 40°F = light, uniform; Reconditioned = light, non-uniform; Blanched = light, uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Blanching	40° F Recon.
A12114-7					
					
A12305-2adg					
					
AFA5661-8					
					
AOR11217-3					
					
AOR13064-2					
					

2021 Late Harvest Tri-State Trial

Accumulated Total Postharvest Rating of Clones

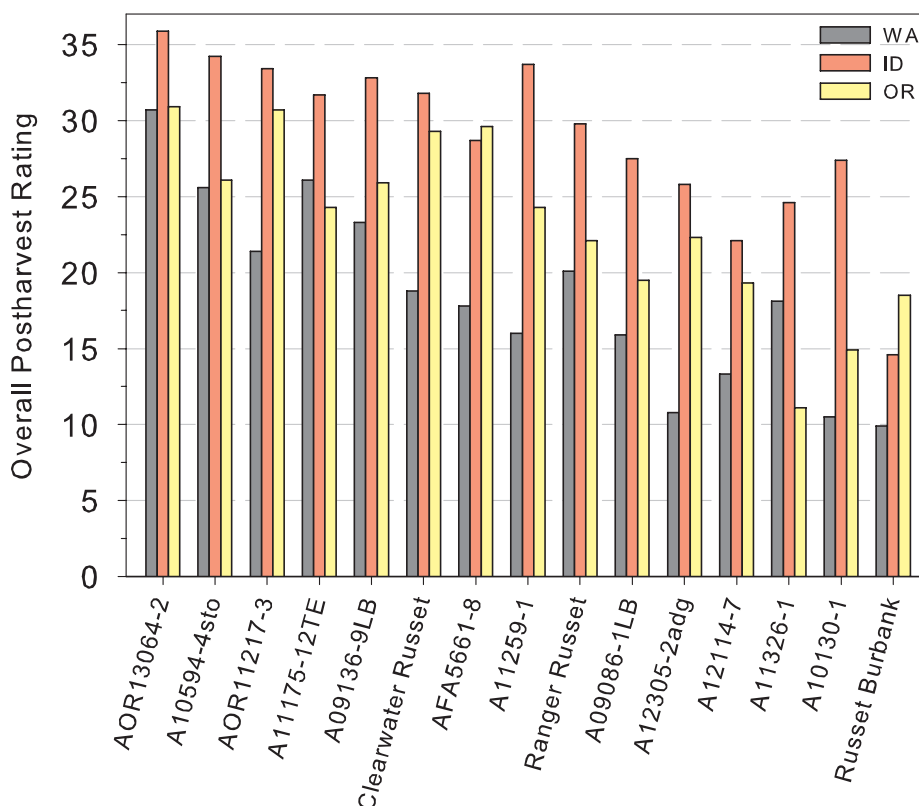
Clone	WA		ID		OR		3 State av. Rating Total
	Rating Total §	Discard §§	Rating Total §	Discard §§	Rating Total §	Discard §§	
15 AOR13064-2	30.7		35.9		30.9	Sp. Gr.	32.5
7 A10594-4sto	25.6		34.2		26.1	Sp. Gr.	28.6
14 AOR11217-3	21.4		33.4		30.7		28.5
8 A11175-12TE	26.1	Sp. Gr.	31.7		24.3	Sp. Gr.	28.0
5 A09136-9LB	23.3		32.8		25.9		27.3
1 Clearwater Russet	18.8		31.8		29.3		26.6
13 AFA5661-8	17.8		28.7		29.6		25.4
9 A11259-1	16.0	Sp. Gr., 40°F	33.7		24.3	Sp. Gr.	24.7
2 Ranger Russet	20.1	40°F	29.8		22.1	40°F	24.0
4 A09086-1LB	15.9	40°F	27.5	40°F	19.5	40°F	21.0
12 A12305-2adg	10.8	40°F	25.8		22.3	40°F	19.6
11 A12114-7	13.3	40°F	22.1	Sp. Gr., 40°F	19.3	Sp. Gr., 40°F	18.2
10 A11326-1	18.1		24.6		11.1	40°F	17.9
6 A10130-1	10.5	Sp. Gr., 40°F	27.4		14.9	Sp. Gr.	17.6
3 Russet Burbank	9.9	Sp. Gr., 40°F	14.6	Sp. Gr., 40°F	18.5	Sp. Gr., 40°F	14.3
	18.6		28.9		23.3		23.6

§ maximum rating possible = 38

§§ Values for the indicated evaluation are lower than the rejection level.

Late Harvest Tri-State Postharvest Ratings

2021 Late Harvest Tri-State Trial



2021 Late Harvest Tri-State Trial

Entries Retained from the 2020 Trials Currently in the Tri-State Trial

Harvested fall of 2020

Held at 48° F until December 17, 2020

Stored at 44° F until analysis in April, 2021

Four clones were retained from the 2020 Tri-State Trial into the 2021 Trial (A10594-4sto, A12305-2adg, AFA5661-8 & AOR11217-3). When averaged across states, AOR11217-3* produced the lightest fries (42.9 ref units) for the second year in a row. AFA5661-8 also produced very light fries with an average of 42.6. All entries and the check cultivars Clearwater, Ranger Russet and Russet Burbank had sprout lengths that averaged between 1.33 and 6 inches.

		PHOTOVOLT READING				USDA	% REDUCING SUGAR			Sprouting	
Clone		stem	bud	avg	DIFF	COLOR	stem	bud	avg	percent	length (in.)
Washington											
1 Clearwater		33.3	47.3	40.3	14.1	0	1.1	0.5	0.8	100	1.5
2 Ranger Russet		28.4	33.8	31.1	7.1	1	1.5	1.1	1.3	100	3.0
3 Russet Burbank		22.5	34.3	28.4	12.0	2	2.3	1.0	1.7	100	3.0
4 A10594-4sto		30.6	35.7	33.2	6.7	0	1.3	1.0	1.1	100	5.0
5 A12305-2adg		22.0	41.4	31.7	19.5	2	2.4	0.7	1.5	100	2.5
6 AFA5661-8		32.2	39.9	36.1	8.1	0	1.2	0.7	1.0	100	3.0
7 AOR11217-3		38.0	47.1	42.5	9.1	0	0.8	0.5	0.7	100	6.0
Average		LSD 0.05		2.8	4.5						
		29.5	39.9	34.7	10.9	0.7	1.5	0.8	1.2	100	
Idaho											
1 Clearwater		43.9	48.6	46.2	5.9	0	0.6	0.5	0.6	100	1.0
2 Ranger Russet		27.4	33.7	30.6	8.9	1	1.7	1.1	1.4	100	4.0
3 Russet Burbank		25.9	38.0	31.9	14.4	1	1.8	0.8	1.3	100	2.0
4 A10594-4sto		36.7	34.8	35.7	5.3	0	0.9	1.0	1.0	100	5.0
5 A12305-2adg		35.6	46.2	40.9	10.6	0	1.0	0.5	0.8	100	3.0
6 AFA5661-8		43.2	44.3	43.8	2.7	0	0.6	0.6	0.6	100	3.5
7 AOR11217-3		42.1	50.7	46.4	9.1	0	0.6	0.5	0.6	100	3.0
Average		LSD 0.05		3.6	5.7						
		36.4	42.3	39.4	8.1	0.3	1.0	0.7	0.9	100	
Oregon											
1 Clearwater		46.0	46.4	46.2	3.5	0	0.5	0.5	0.5	100	1.5
2 Ranger Russet		29.7	31.6	30.6	5.4	1	1.4	1.2	1.3	100	3.5
3 Russet Burbank		31.2	35.7	33.4	4.6	0	1.3	1.0	1.1	100	4.0
4 A10594-4sto		37.4	38.5	37.9	2.5	0	0.9	0.8	0.8	100	8.0
5 A12305-2adg		39.2	47.9	43.6	8.9	0	0.8	0.5	0.6	100	5.0
6 AFA5661-8		48.5	47.4	48.0	2.8	0	0.5	0.5	0.5	100	7.0
7 AOR11217-3		41.2	38.3	39.8	6.1	0	0.7	0.8	0.7	100	5.0
Average		LSD 0.05		2.8	3.3						
		39.0	40.8	39.9	4.8	0.1	0.9	0.8	0.8	100	

Date test performed:

Washington April 26

Idaho April 27

Oregon April 28

2021 Late Harvest Tri-State Trial Prior to Storage

		PHOTOVOLT READING				USDA	SPECIFIC		
Clone		stem	bud	av	rtg §	DIFF	COLOR	GRAVITY	rtg
Washington									
1 Clearwater Russet		28.3	38.9	33.6	3-	10.6	1	1.078	2
2 Ranger Russet		24.5	32.7	28.6	2+	8.7	1	1.083	5
3 Russet Burbank		18.8	40.1	29.4	2-	21.3	3	1.070	0
4 A09086-1LB		25.9	35.4	30.7	3-	9.6	1	1.088	5
5 A09136-9LB		34.7	37.8	36.3	4+	3.2	0	1.082	4
6 A10130-1		21.3	30.2	25.7	2+	8.9	2	1.062	0
7 A10594-4sto		39.7	41.4	40.5	5+	3.1	0	1.083	5
8 A11175-12TE		38.1	44.4	41.3	5+	6.8	0	1.071	0
9 A11259-1		23.3	38.8	31.0	3-	15.5	2	1.069	0
10 A11326-1		31.8	39.2	35.5	4+	7.8	0	1.088	5
11 A12114-7		25.7	32.6	29.1	2+	7.5	1	1.078	2
12 A12305-2adg		19.3	39.3	29.3	2-	20.3	3	1.077	1
13 AFA5661-8		24.0	36.4	30.2	2-	12.4	2	1.083	5
14 AOR11217-3		31.8	45.5	38.7	4-	13.8	0	1.084	5
15 AOR13064-2		35.9	39.4	37.6	4+	4.8	0	1.080	3
Average		28.2	LSD 0.05 38.1	3.2 33.2		4.5 10.3	1	0.006 1.078	
Idaho									
1 Clearwater Russet		41.3	40.2	40.8	5+	3.3	0	1.085	5
2 Ranger Russet		35.8	35.3	35.5	4+	6.1	0	1.089	4
3 Russet Burbank		24.1	25.7	24.9	2+	3.8	2	1.072	0
4 A09086-1LB		34.4	38.6	36.5	4+	4.9	0	1.091	4
5 A09136-9LB		44.9	44.3	44.6	5+	3.7	0	1.087	5
6 A10130-1		35.7	38.2	37.0	4+	4.2	0	1.080	3
7 A10594-4sto		43.9	42.1	43.0	5+	2.1	0	1.086	5
8 A11175-12TE		47.2	46.4	46.8	5+	3.6	0	1.081	4
9 A11259-1		47.7	40.8	44.2	5+	6.8	0	1.085	5
10 A11326-1		32.3	26.7	29.5	2+	6.7	0	1.094	2
11 A12114-7		31.6	38.8	35.2	3+	8.0	0	1.075	0
12 A12305-2adg		40.4	38.4	39.4	4+	5.5	0	1.095	2
13 AFA5661-8		40.0	40.8	40.4	4+	2.6	0	1.099	1
14 AOR11217-3		42.3	38.9	40.6	5+	3.9	0	1.084	5
15 AOR13064-2		46.6	47.1	46.8	5+	3.5	0	1.087	5
Average		39.2	LSD 0.05 38.8	4.4 39.0		3.2 4.6	0	0.006 1.086	
Oregon									
1 Clearwater Russet		44.3	44.0	44.2	5+	3.9	0	1.076	1
2 Ranger Russet		36.8	40.0	38.4	4+	4.4	0	1.079	2
3 Russet Burbank		29.9	37.3	33.6	3+	7.4	1	1.072	0
4 A09086-1LB		36.6	39.6	38.1	4+	5.2	0	1.081	4
5 A09136-9LB		37.6	39.9	38.7	4+	4.9	0	1.080	3
6 A10130-1		29.5	37.4	33.4	3+	7.8	1	1.068	0
7 A10594-4sto		42.7	43.6	43.2	5+	3.0	0	1.075	0
8 A11175-12TE		45.8	45.8	45.8	5+	2.6	0	1.067	0
9 A11259-1		37.9	40.2	39.1	4+	3.9	0	1.071	0
10 A11326-1		30.7	39.6	35.2	3-	9.3	0	1.079	2
11 A12114-7		36.0	37.0	36.5	4+	3.9	0	1.070	0
12 A12305-2adg		38.5	44.1	41.3	5+	5.8	0	1.077	1
13 AFA5661-8		40.6	43.1	41.9	5+	4.0	0	1.085	5
14 AOR11217-3		40.4	45.0	42.7	5+	6.2	0	1.079	2
15 AOR13064-2		46.8	45.5	46.1	5+	3.2	0	1.072	0
Average		45.0 38.3	LSD 0.05 41.5	3.5 39.9		3.1 5.0	0	0.006 1.075	

Date test performed:

Washington

Sept. 29

Sept. 27

Idaho

Oct. 4

Sept. 30

Oregon

Oct. 1

Sept. 30

§ rtg = rating (1-5, 5 is best); av = average Photovolt reading; Diff = Absolute difference between stem and bud Photovolt reading. Stem to bud differences of nine or greater (-) lose one point and differences of less than nine (+) gain one point in the accumulated total postharvest rating.

2021 Late Harvest Tri-State Trial

Stored at 48°F after Arrival

FRENCH FRY		BRUISE POTENTIAL				SOFT ROT INDEX	
Clone	TASTE PANEL	(percent)		[color 5=darkest]		(percent)	
	rating	stem	bud	stem	bud	stem	bud
Washington							
1 Clearwater Russet	3.8	13	46	1.3	2.0	9	14
2 Ranger Russet	3.1	79	17	3.3	1.3	9	11
3 Russet Burbank	2.9	46	0	2.2	1.0	12	15
4 A09086-1LB	2.9	92	4	3.6	1.1	8	10
5 A09136-9LB	3.3	96	25	3.8	1.5	10	13
6 A10130-1	2.5	13	13	1.4	1.3	19	24
7 A10594-4sto	2.6	67	0	2.5	1.0	6	10
8 A11175-12TE	3.1	4	4	1.1	1.1	15	16
9 A11259-1	3.0	0	0	1.0	1.0	No Sample	
10 A11326-1	3.1	42	8	1.9	1.3	11	16
11 A12114-7	2.3	71	21	2.8	1.5	19	23
12 A12305-2adg	2.8	33	13	1.8	1.3	9	13
13 AFA5661-8	2.8	67	0	2.5	1.0	5	8
14 AOR11217-3	3.4	29	4	1.6	1.1	10	14
15 AOR13064-2	3.7	79	8	3.0	1.2	13	18
LSD 0.05	0.7	27	19			4	6
Average	3.0	48.6	10.8	2.2	1.2	11.1	14.6
Idaho							
1 Clearwater Russet	3.8	71	25	2.8	1.6	10	9
2 Ranger Russet	3.8	83	13	3.3	1.3	11	6
3 Russet Burbank	2.6	13	0	1.3	1.0	9	10
4 A09086-1LB	3.5	75	4	3.0	1.1	9	9
5 A09136-9LB	3.8	54	13	2.6	1.3	9	9
6 A10130-1	3.4	92	8	3.4	1.2	11	12
7 A10594-4sto	3.2	71	0	2.8	1.0	8	9
8 A11175-12TE	3.7	4	0	1.1	1.0	10	13
9 A11259-1	3.7	0	0	1.0	1.0	6	7
10 A11326-1	3.6	50	8	2.3	1.2	8	9
11 A12114-7	3.1	54	0	2.3	1.0	13	13
12 A12305-2adg	3.8	75	17	2.8	1.3	9	10
13 AFA5661-8	3.7	79	4	3.1	1.1	6	6
14 AOR11217-3	3.4	38	4	1.9	1.1	6	7
15 AOR13064-2	3.9	29	0	1.9	1.0	11	12
LSD 0.05	0.4	26	16			3	3
Average	3.5	52.5	6.4	2.4	1.1	9.1	9.6
Oregon							
1 Clearwater Russet	4.3	8	8	1.2	1.2	12	14
2 Ranger Russet	3.1	79	0	3.3	1.0	10	11
3 Russet Burbank	2.5	96	0	4.0	1.0	10	15
4 A09086-1LB	3.5	83	4	3.1	1.1	6	5
5 A09136-9LB	3.9	67	4	2.6	1.1	8	7
6 A10130-1	2.9	50	0	2.3	1.0	8	8
7 A10594-4sto	3.1	75	0	3.0	1.0	6	6
8 A11175-12TE	3.3	21	0	1.5	1.0	9	19
9 A11259-1	3.3	0	0	1.0	1.0	6	8
10 A11326-1	3.1	88	8	3.8	1.2	8	7
11 A12114-7	3.3	75	17	2.9	1.4	11	11
12 A12305-2adg	3.3	17	0	1.4	1.0	7	8
13 AFA5661-8	3.6	71	0	2.8	1.0	7	4
14 AOR11217-3	3.7	29	8	1.6	1.2	6	7
15 AOR13064-2	3.9	4	0	1.3	1.0	9	10
LSD 0.05	0.6	25	11			3	11
Average	3.4	50.8	3.3	2.4	1.1	8.1	9.3

Date test performed:

Washington

Oct. 19

Oct. 27

Nov. 4

Idaho

Oct. 22

Oct. 30

Nov. 16

Oregon

Oct. 21

Oct. 29

Nov. 9

2021 Late Harvest Tri-State Trial

Stored at 48°F for 60 Days

PHOTOVOLT READING					DIFF	USDA COLOR	% REDUCING SUGAR		SPROUTING	
Clone	stem	bud	average	rtg §			stem	bud	(%)	length (in)
Washington										
1 Clearwater Russet	31.4	46.4	38.9	4-	15.1	0	1.3	0.5	60	0.13
2 Ranger Russet	28.2	36.5	32.4	3+	8.8	1	1.6	0.9	93	0.50
3 Russet Burbank	18.4	35.4	26.9	2-	17.0	3	2.9	1.0	0	
4 A09086-1LB	22.5	30.7	26.6	2+	8.2	2	2.3	1.3	100	0.50
5 A09136-9LB	32.3	36.9	34.6	3+	5.4	0	1.2	0.9	100	1.00
6 A10130-1	20.7	28.3	24.5	2-	9.1	2	2.6	1.6	17	0.50
7 A10594-4sto	35.1	39.3	37.2	4+	5.1	0	1.0	0.8	87	0.25
8 A11175-12TE	37.7	45.7	41.7	5+	8.1	0	0.8	0.6	13	0.13
9 A11259-1	28.6	34.8	31.7	3+	7.3	1	1.5	1.0	10	0.25
10 A11326-1	22.9	38.0	30.4	2-	15.1	2	2.2	0.8	67	1.00
11 A12114-7	29.8	34.7	32.3	3+	4.9	1	1.4	1.0	73	0.13
12 A12305-2adg	19.0	33.9	26.4	2-	15.2	3	2.8	1.1	0	
13 AFA5661-8	25.3	37.4	31.4	3-	12.1	1	1.9	0.9	33	0.25
14 AOR11217-3	34.1	44.6	39.4	4-	10.8	0	1.1	0.6	13	0.25
15 AOR13064-2	37.5	45.0	41.3	5+	7.9	0	0.8	0.6	33	0.13
Average	LSD 0.05		3.5		5.1				21	
	28.2	37.8	33.0		10.0	1	1.7	0.9	47	
Idaho										
1 Clearwater Russet	39.1	41.5	40.3	4+	3.9	0	0.8	0.7	7	0.13
2 Ranger Russet	41.0	41.8	41.4	5+	4.8	0	0.7	0.7	13	0.13
3 Russet Burbank	25.8	29.9	27.9	2+	6.5	1	1.8	1.4	0	
4 A09086-1LB	42.8	45.3	44.1	5+	3.8	0	0.6	0.6	53	0.13
5 A09136-9LB	47.3	45.6	46.5	5+	2.5	0	0.5	0.6	100	0.50
6 A10130-1	36.3	41.3	38.8	4+	5.8	0	0.9	0.7	0	
7 A10594-4sto	41.8	44.4	43.1	5+	3.7	0	0.7	0.6	8	0.13
8 A11175-12TE	49.2	48.7	49.0	5+	4.0	0	0.5	0.5	0	
9 A11259-1	43.3	36.6	40.0	4+	6.8	0	0.6	0.9	27	0.13
10 A11326-1	41.1	36.0	38.5	4+	6.6	0	0.7	0.9	80	0.13
11 A12114-7	37.1	39.6	38.3	4+	4.0	0	0.9	0.7	0	
12 A12305-2adg	44.8	46.3	45.5	5+	3.0	0	0.6	0.5	7	0.13
13 AFA5661-8	45.2	46.1	45.7	5+	3.7	0	0.6	0.5	15	0.13
14 AOR11217-3	46.2	43.1	44.6	5+	4.7	0	0.5	0.6	0	
15 AOR13064-2	50.2	48.6	49.4	5+	3.0	0	0.5	0.5	0	
Average	LSD 0.05		4.3		3.0				17	
	42.1	42.3	42.2		4.5	0	0.7	0.7	21	
Oregon										
1 Clearwater Russet	48.5	48.6	48.5	5+	3.1	0	0.5	0.5	85	0.50
2 Ranger Russet	34.4	37.5	35.9	4+	5.4	0	1.0	0.9	100	1.25
3 Russet Burbank	28.5	33.7	31.1	3+	5.6	1	1.5	1.1	0	
4 A09086-1LB	28.2	37.0	32.6	3+	8.8	1	1.6	0.9	100	1.00
5 A09136-9LB	34.5	36.8	35.6	4+	6.1	0	1.0	0.9	93	2.50
6 A10130-1	24.8	31.6	28.2	2-	9.0	1	2.0	1.2	73	1.00
7 A10594-4sto	41.2	41.4	41.3	5+	2.7	0	0.7	0.7	87	1.50
8 A11175-12TE	44.8	46.1	45.4	5+	2.5	0	0.6	0.5	93	1.00
9 A11259-1	40.9	41.7	41.3	5+	2.7	0	0.7	0.7	100	1.00
10 A11326-1	23.7	35.9	29.8	2-	18.4	2	2.1	0.9	100	1.25
11 A12114-7	37.9	37.6	37.7	4+	3.3	0	0.8	0.8	93	1.50
12 A12305-2adg	37.2	41.6	39.4	4+	4.4	0	0.9	0.7	69	0.13
13 AFA5661-8	38.4	42.3	40.3	4+	5.8	0	0.8	0.6	80	1.00
14 AOR11217-3	44.4	46.7	45.5	5+	3.9	0	0.6	0.5	92	1.00
15 AOR13064-2	50.7	48.8	49.8	5+	3.3	0	0.5	0.5	87	1.00
Average	LSD 0.05		3.8		3.7				18	
	37.2	40.5	38.8		5.7	0	1.0	0.8	83	

Date test performed:

Washington

Dec. 1

Dec. 1

Dec. 16

Idaho

Dec. 11

Dec. 11

Dec. 16

Oregon

Dec. 6

Dec. 6

Dec. 16

§ rtg = rating (1-5, 5 is best); av = average Photovolt reading; Diff = Absolute difference between stem and bud Photovolt reading. Stem to bud differences of nine or greater (-) lose one point and differences of less than nine (+) gain one point in the accumulated total postharvest rating.

Sprouting was rated after approximately 3 months in storage.

2021 Late Harvest Tri-State Trial

Stored at 44°F for 60 Days

		PHOTOVOLT READING			DIFF	USDA COLOR	% REDUCING SUGAR	
Clone	stem	bud	average	rtg §			stem	bud
Washington								
1 Clearwater Russet	24.5	38.7	31.6	3-	14.1	1	2.0	0.8
2 Ranger Russet	25.1	33.4	29.3	2-	10.8	1	1.9	1.1
3 Russet Burbank	15.3	32.9	24.1	1-	17.5	3	3.6	1.1
4 A09086-1LB	16.1	25.1	20.6	1-	9.0	3	3.4	1.9
5 A09136-9LB	32.0	38.0	35.0	3+	7.1	0	1.2	0.8
6 A10130-1	17.0	26.0	21.5	1-	9.5	3	3.2	1.8
7 A10594-4sto	29.0	39.3	34.1	3-	10.4	1	1.5	0.8
8 A11175-12TE	34.6	40.9	37.8	4+	7.7	0	1.0	0.7
9 A11259-1	23.4	31.7	27.5	2+	8.3	2	2.2	1.2
10 A11326-1	22.7	32.6	27.6	2-	9.9	2	2.3	1.2
11 A12114-7	21.3	32.2	26.7	2-	10.9	2	2.5	1.2
12 A12305-2adg	14.0	31.6	22.8	1-	17.6	4	3.9	1.2
13 AFA5661-8	17.8	39.4	28.6	2-	21.6	3	3.0	0.8
14 AOR11217-3	25.3	42.7	34.0	3-	17.4	1	1.9	0.6
15 AOR13064-2	34.3	42.3	38.3	4+	8.0	0	1.0	0.6
Average	23.5	LSD 0.05 35.1	2.7 29.3		4.5 12.0	2	2.3	1.1
Idaho								
1 Clearwater Russet	39.1	41.0	40.1	4+	5.6	0	0.8	0.7
2 Ranger Russet	32.7	34.2	33.4	3+	6.0	0	1.2	1.1
3 Russet Burbank	23.7	24.0	23.9	1+	2.5	2	2.1	2.1
4 A09086-1LB	35.7	40.1	37.9	4+	6.4	0	1.0	0.7
5 A09136-9LB	49.3	48.0	48.6	5+	2.5	0	0.5	0.5
6 A10130-1	32.5	37.3	34.9	3+	4.8	0	1.2	0.9
7 A10594-4sto	39.7	42.1	40.9	5+	3.4	0	0.7	0.6
8 A11175-12TE	45.1	45.3	45.2	5+	2.0	0	0.6	0.6
9 A11259-1	45.0	36.5	40.8	5+	8.4	0	0.6	0.9
10 A11326-1	39.3	36.9	38.1	4+	3.0	0	0.8	0.9
11 A12114-7	38.9	41.1	40.0	4+	3.3	0	0.8	0.7
12 A12305-2adg	36.4	35.8	36.1	4+	3.3	0	0.9	0.9
13 AFA5661-8	42.0	46.2	44.1	5+	4.5	0	0.7	0.5
14 AOR11217-3	41.1	40.7	40.9	5+	4.0	0	0.7	0.7
15 AOR13064-2	51.4	49.8	50.6	5+	2.3	0	0.5	0.5
Average	39.5	LSD 0.05 39.9	4.1 39.7		3.0 4.1	0	0.9	0.8
Oregon								
1 Clearwater Russet	43.5	46.4	44.9	5+	5.4	0	0.6	0.5
2 Ranger Russet	26.8	33.1	30.0	2+	7.3	1	1.7	1.1
3 Russet Burbank	21.3	28.7	25.0	2+	7.6	2	2.5	1.5
4 A09086-1LB	22.1	31.3	26.7	2-	9.2	2	2.4	1.3
5 A09136-9LB	33.5	36.2	34.9	3+	2.9	0	1.1	0.9
6 A10130-1	27.8	32.1	30.0	2+	7.8	1	1.6	1.2
7 A10594-4sto	33.5	40.5	37.0	4+	7.6	0	1.1	0.7
8 A11175-12TE	40.4	42.0	41.2	5+	2.3	0	0.7	0.7
9 A11259-1	36.2	38.9	37.5	4+	4.0	0	0.9	0.8
10 A11326-1	21.4	34.6	28.0	2-	14.8	2	2.5	1.0
11 A12114-7	29.7	33.9	31.8	3+	4.6	1	1.4	1.1
12 A12305-2adg	26.1	37.3	31.7	3-	11.3	1	1.8	0.9
13 AFA5661-8	36.7	40.6	38.7	4+	4.3	0	0.9	0.7
14 AOR11217-3	41.5	47.2	44.4	5+	5.7	0	0.7	0.5
15 AOR13064-2	47.3	46.8	47.0	5+	2.2	0	0.5	0.5
Average	32.5		4.2 35.2		4.3 6.5	1	1.4	0.9

Date test performed:

Washington

Dec. 3

Dec. 3

Idaho

Dec. 12

Dec. 12

Oregon

Dec. 8

Dec. 8

§ rtg = rating (1-5, 5 is best); av = average Photovolt reading; Diff = Absolute difference between stem and bud Photovolt reading. Stem to bud differences of nine or greater (-) lose one point and differences of less than nine (+) gain one point in the accumulated total postharvest rating.

2021 Late Harvest Tri-State Trial

Stored at 40°F for 60 Days and Reconditioned

		PHOTOVOLT(60 Days at 40°F)						PHOTOVOLT AFTER RECONDITIONING (21 days at 60°F)					
SPROUTING								USDA					
Clone	(%)	stem	bud	average	rtg	\$	DIFF	COLOR	stem	bud	average	DIFF	COLOR
Washington													
1 Clearwater Russet	0	16.7	37.5	27.1	2	20.8	3		21.5	44.8	33.2	23.3	2
2 Ranger Russet	0	14.5	22.6	18.6	0	10.2	3		22.6	37.7	30.2	17.4	2
3 Russet Burbank	0	10.3	20.3	15.3	0	10.0	4		13.1	29.6	21.4	16.5	4
4 A09086-1LB	0	7.3	14.4	10.8	0	7.1	4		16.0	26.3	21.1	10.3	3
5 A09136-9LB	15	26.3	28.7	27.5	2	3.6	1		30.3	36.2	33.3	6.7	1
6 A10130-1	0	14.9	20.0	17.4	0	5.5	3		16.4	24.3	20.4	7.8	3
7 A10594-4sto	0	21.9	34.1	28.0	2	12.3	2		27.3	41.1	34.2	13.8	1
8 A11175-12TE	0	23.3	33.8	28.6	2	10.5	2		29.6	41.2	35.4	11.6	1
9 A11259-1	0	15.0	22.7	18.9	0	8.3	3		18.2	25.3	21.8	7.2	3
10 A11326-1	0	13.9	26.0	20.0	1	12.1	4		22.8	44.4	33.6	21.6	2
11 A12114-7	0	10.9	14.4	12.6	0	3.5	4		15.8	27.9	21.8	12.1	3
12 A12305-2adg	0	11.5	19.9	15.7	0	8.3	4		12.5	28.6	20.5	16.0	4
13 AFA5661-8	0	16.1	29.0	22.5	1	12.9	3		18.8	38.4	28.6	19.7	3
14 AOR11217-3	0	17.3	25.7	21.5	1	8.4	3		20.1	38.8	29.4	18.6	2
15 AOR13064-2	0	31.2	39.3	35.2	3	8.2	0		29.0	42.9	36.0	13.9	1
LSD 0.05	6.7			2.4		3.7					3.5	5.5	
Average	1	16.7	25.9	21.3		9.5	3		20.9	35.2	28.0	14.4	2
Idaho													
1 Clearwater Russet	0	34.1	37.9	36.0	4	3.8	0		32.2	39.0	35.6	12.0	0
2 Ranger Russet	0	23.8	28.8	26.3	2	5.7	2		35.1	43.5	39.3	8.4	0
3 Russet Burbank	0	14.6	16.0	15.3	0	3.5	3		22.6	27.2	24.9	4.6	2
4 A09086-1LB	0	15.3	22.8	19.1	0	7.5	3		26.7	38.2	32.5	11.9	1
5 A09136-9LB	0	34.4	35.6	35.0	3	5.5	0		44.0	46.6	45.3	4.1	0
6 A10130-1	0	28.3	35.3	31.8	3	7.7	1		29.9	36.1	33.0	6.7	1
7 A10594-4sto	0	27.8	33.6	30.7	3	6.8	1		32.4	44.1	38.3	11.6	0
8 A11175-12TE	0	27.5	33.3	30.4	2	7.2	1		35.7	45.0	40.3	9.4	0
9 A11259-1	0	35.4	31.4	33.4	3	4.8	0		37.8	38.8	38.3	5.8	0
10 A11326-1	0	32.4	31.7	32.0	3	2.8	0		38.4	39.9	39.2	3.7	0
11 A12114-7	0	16.2	20.2	18.2	0	4.4	3		27.7	28.6	28.1	9.2	1
12 A12305-2adg	0	21.4	26.0	23.7	1	5.5	2		17.3	23.1	20.2	6.4	3
13 AFA5661-8	0	30.3	35.9	33.1	3	5.7	1		33.7	40.9	37.3	8.7	0
14 AOR11217-3	0	26.2	27.5	26.9	2	3.2	1		31.0	35.5	33.3	5.0	0
15 AOR13064-2	0	36.0	40.0	38.0	4	5.2	0		39.0	48.1	43.6	9.1	0
LSD 0.05	ns			4.2		2.9					4.7	4.2	
Average	0	26.9	30.4	28.7		5.3	1		32.2	38.3	35.3	7.8	1
Oregon													
1 Clearwater Russet	33	26.4	37.9	32.2	3	11.5	1		29.4	42.3	35.9	12.9	1
2 Ranger Russet	8	15.0	20.5	17.8	0	6.1	3		18.5	37.9	28.2	19.4	3
3 Russet Burbank	0	11.7	16.1	13.9	0	4.4	4		17.7	27.7	22.7	10.1	3
4 A09086-1LB	33	13.2	18.4	15.8	0	6.1	4		16.4	27.7	22.1	11.3	3
5 A09136-9LB	60	30.0	34.4	32.2	3	5.1	1		32.2	38.7	35.4	6.5	0
6 A10130-1	0	20.7	25.9	23.3	1	7.3	2		19.1	24.7	21.9	8.9	3
7 A10594-4sto	0	22.0	27.7	24.8	2	6.0	2		24.8	40.4	32.6	15.5	1
8 A11175-12TE	0	27.2	27.1	27.2	2	2.8	1		33.5	35.0	34.2	2.9	0
9 A11259-1	0	19.8	23.2	21.5	1	3.9	2		20.5	27.3	23.9	6.9	2
10 A11326-1	0	10.1	25.0	17.5	0	15.0	4		18.8	28.3	23.5	14.1	3
11 A12114-7	0	15.1	18.4	16.8	0	3.3	3		23.1	28.1	25.6	6.5	2
12 A12305-2adg	0	14.7	24.2	19.4	0	9.5	3		14.7	27.6	21.1	12.9	3
13 AFA5661-8	0	29.4	31.0	30.2	2	4.9	1		29.8	41.1	35.5	11.3	1
14 AOR11217-3	0	30.3	32.6	31.4	3	5.1	1		30.0	42.6	36.3	12.6	1
15 AOR13064-2	0	39.9	43.5	41.7	5	4.3	0		45.3	46.1	45.7	3.7	0
LSD 0.05	16			3.6		3.8					3.8	4.9	
Average	9	21.7	27.1	24.4		6.4	2		24.9	34.4	29.6	10.4	2

Date test performed:

Washington	Dec. 17	Dec. 2	Dec. 14
Idaho	Dec. 17	Dec. 13	Dec. 15
Oregon	Dec. 17	Dec. 7	Dec. 15

DIFF = Absolute difference between bud and stem Photovolt reading.
 Sprouting was rated after approximately 3 months in storage.

2021 Late Harvest Tri-State Trial

Stored at 40°F for 60 Days and Water Blanched

PHOTOVOLT(60 Days at 40°F)							PHOTOVOLT AFTER WATER BLANCHING				
Clone	stem	bud	average	rtg §	DIFF	USDA COLOR	stem	10 min @ 160°F bud	average	DIFF	USDA COLOR
Washington											
1 Clearwater Russet	16.7	37.5	27.1	2	20.8	3	23.3	40.6	32.0	17.3	2
2 Ranger Russet	14.5	22.6	18.6	0	10.2	3	17.8	26.2	22.0	8.5	3
3 Russet Burbank	10.3	20.3	15.3	0	10.0	4	16.4	26.0	21.2	9.7	3
4 A09086-1LB	7.3	14.4	10.8	0	7.1	4	15.9	22.1	19.0	6.3	3
5 A09136-9LB	26.3	28.7	27.5	2	3.6	1	32.4	33.9	33.2	2.6	0
6 A10130-1	14.9	20.0	17.4	0	5.5	3	17.8	21.8	19.8	4.7	3
7 A10594-4sto	21.9	34.1	28.0	2	12.3	2	27.4	35.4	31.4	8.1	1
8 A11175-12TE	23.3	33.8	28.6	2	10.5	2	30.3	35.5	32.9	5.6	1
9 A11259-1	15.0	22.7	18.9	0	8.3	3	20.0	27.7	23.8	7.9	2
10 A11326-1	13.9	26.0	20.0	1	12.1	4	19.1	31.5	25.3	12.4	3
11 A12114-7	10.9	14.4	12.6	0	3.5	4	17.2	20.0	18.6	3.2	3
12 A12305-2adg	11.5	19.9	15.7	0	8.3	4	13.5	23.4	18.4	9.8	4
13 AFA5661-8	16.1	29.0	22.5	1	12.9	3	20.3	31.5	25.9	11.2	2
14 AOR11217-3	17.3	25.7	21.5	1	8.4	3	22.4	28.7	25.5	7.0	2
15 AOR13064-2	31.2	39.3	35.2	3	8.2	0	35.9	38.2	37.0	5.5	0
LSD 0.05			2.4		3.7				2.4	3.7	
Average	16.7	25.9	21.3		9.5	3	22.0	29.5	25.7	8.0	2
Idaho											
1 Clearwater Russet	34.1	37.9	36.0	4	3.8	0	44.9	44.4	44.6	3.8	0
2 Ranger Russet	23.8	28.8	26.3	2	5.7	2	36.7	36.3	36.5	4.0	0
3 Russet Burbank	14.6	16.0	15.3	0	3.5	3	21.7	20.1	20.9	4.6	2
4 A09086-1LB	15.3	22.8	19.1	0	7.5	3	26.8	31.9	29.4	5.1	1
5 A09136-9LB	34.4	35.6	35.0	3	5.5	0	46.0	44.8	45.4	2.4	0
6 A10130-1	28.3	35.3	31.8	3	7.7	1	37.0	42.0	39.5	5.0	0
7 A10594-4sto	27.8	33.6	30.7	3	6.8	1	32.3	35.7	34.0	5.1	0
8 A11175-12TE	27.5	33.3	30.4	2	7.2	1	38.6	39.2	38.9	3.7	0
9 A11259-1	35.4	31.4	33.4	3	4.8	0	40.6	37.3	38.9	3.7	0
10 A11326-1	32.4	31.7	32.0	3	2.8	0	39.5	36.6	38.0	3.4	0
11 A12114-7	16.2	20.2	18.2	0	4.4	3	25.7	28.5	27.1	4.2	1
12 A12305-2adg	21.4	26.0	23.7	1	5.5	2	40.0	42.3	41.2	3.5	0
13 AFA5661-8	30.3	35.9	33.1	3	5.7	1	29.7	31.4	30.5	2.8	1
14 AOR11217-3	26.2	27.5	26.9	2	3.2	1	34.3	34.3	34.3	3.0	0
15 AOR13064-2	36.0	40.0	38.0	4	5.2	0	44.2	43.9	44.1	3.2	0
LSD 0.05			4.2		2.9				3.5	2.3	
Average	26.9	30.4	28.7		5.3	1.2	35.9	36.6	36.2	3.8	0
Oregon											
1 Clearwater Russet	26.4	37.9	32.2	3	11.5	1	35.5	43.2	39.4	8.1	0
2 Ranger Russet	15.0	20.5	17.8	0	6.1	3	22.5	28.2	25.4	6.1	2
3 Russet Burbank	11.7	16.1	13.9	0	4.4	4	18.2	23.9	21.1	5.8	3
4 A09086-1LB	13.2	18.4	15.8	0	6.1	4	24.0	29.2	26.6	5.2	2
5 A09136-9LB	30.0	34.4	32.2	3	5.1	1	38.7	39.5	39.1	2.8	0
6 A10130-1	20.7	25.9	23.3	1	7.3	2	28.1	31.3	29.7	5.4	1
7 A10594-4sto	22.0	27.7	24.8	2	6.0	2	31.1	33.7	32.4	3.9	0
8 A11175-12TE	27.2	27.1	27.2	2	2.8	1	35.0	33.7	34.3	2.5	0
9 A11259-1	19.8	23.2	21.5	1	3.9	2	33.6	33.8	33.7	2.7	0
10 A11326-1	10.1	25.0	17.5	0	15.0	4	19.2	32.4	25.8	14.0	3
11 A12114-7	15.1	18.4	16.8	0	3.3	3	21.0	24.3	22.7	3.9	2
12 A12305-2adg	14.7	24.2	19.4	0	9.5	3	23.3	31.0	27.2	8.6	2
13 AFA5661-8	29.4	31.0	30.2	2	4.9	1	37.0	38.0	37.5	3.9	0
14 AOR11217-3	30.3	32.6	31.4	3	5.1	1	37.8	39.7	38.7	4.8	0
15 AOR13064-2	39.9	43.5	41.7	5	4.3	0	42.7	42.7	42.7	2.0	0
LSD 0.05			3.6		3.8				xx	xx	
Average	21.7	27.1	24.4		6.4	2.1	29.8	33.6	31.7	5.3	1

Date test performed:

Washington

Dec. 2

Dec. 2

Idaho

Dec. 13

Dec. 13

Oregon

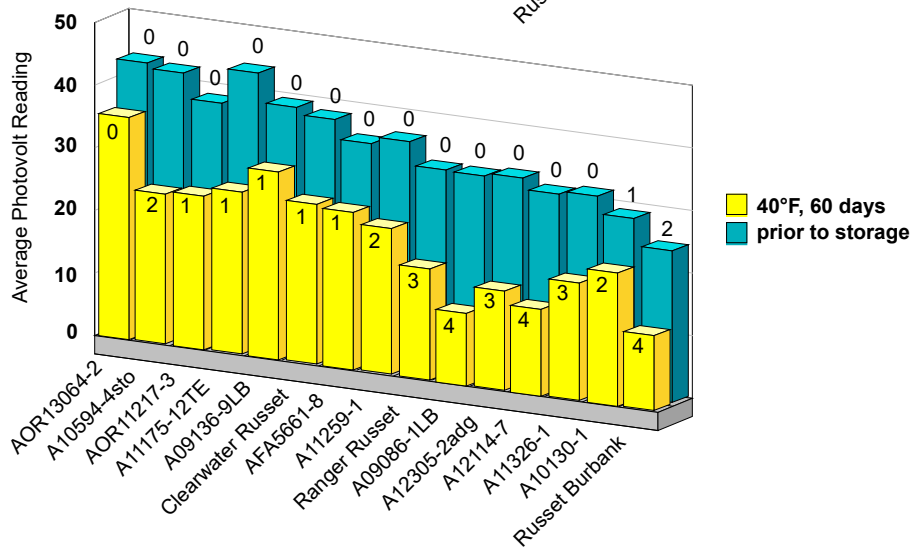
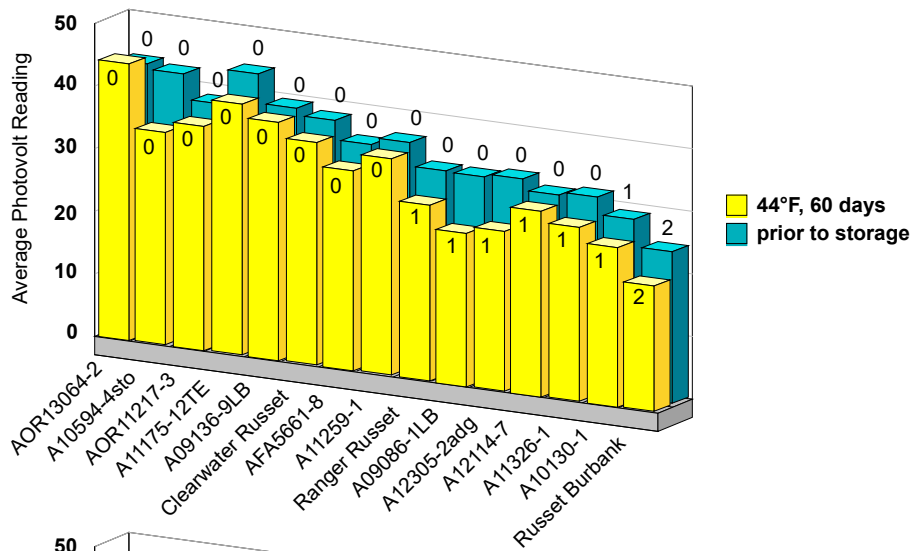
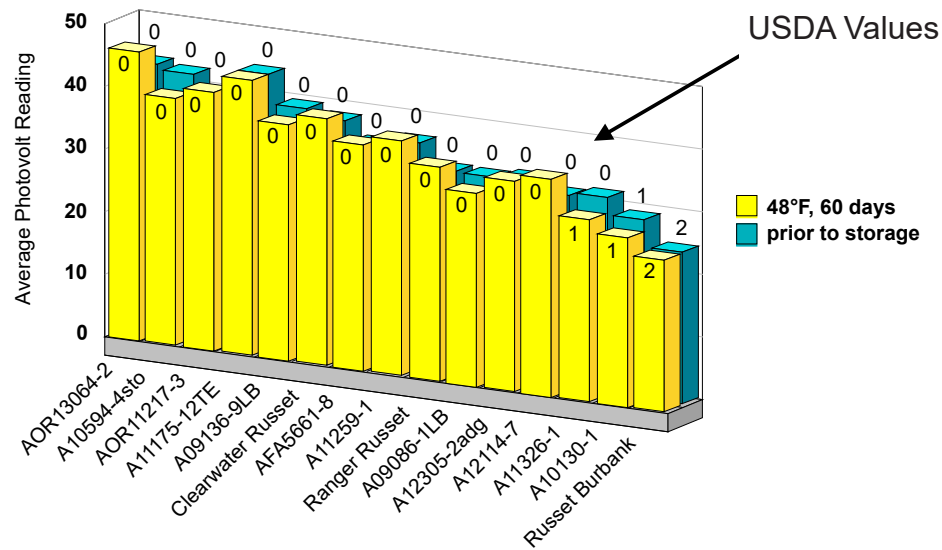
Dec. 7

Dec. 7

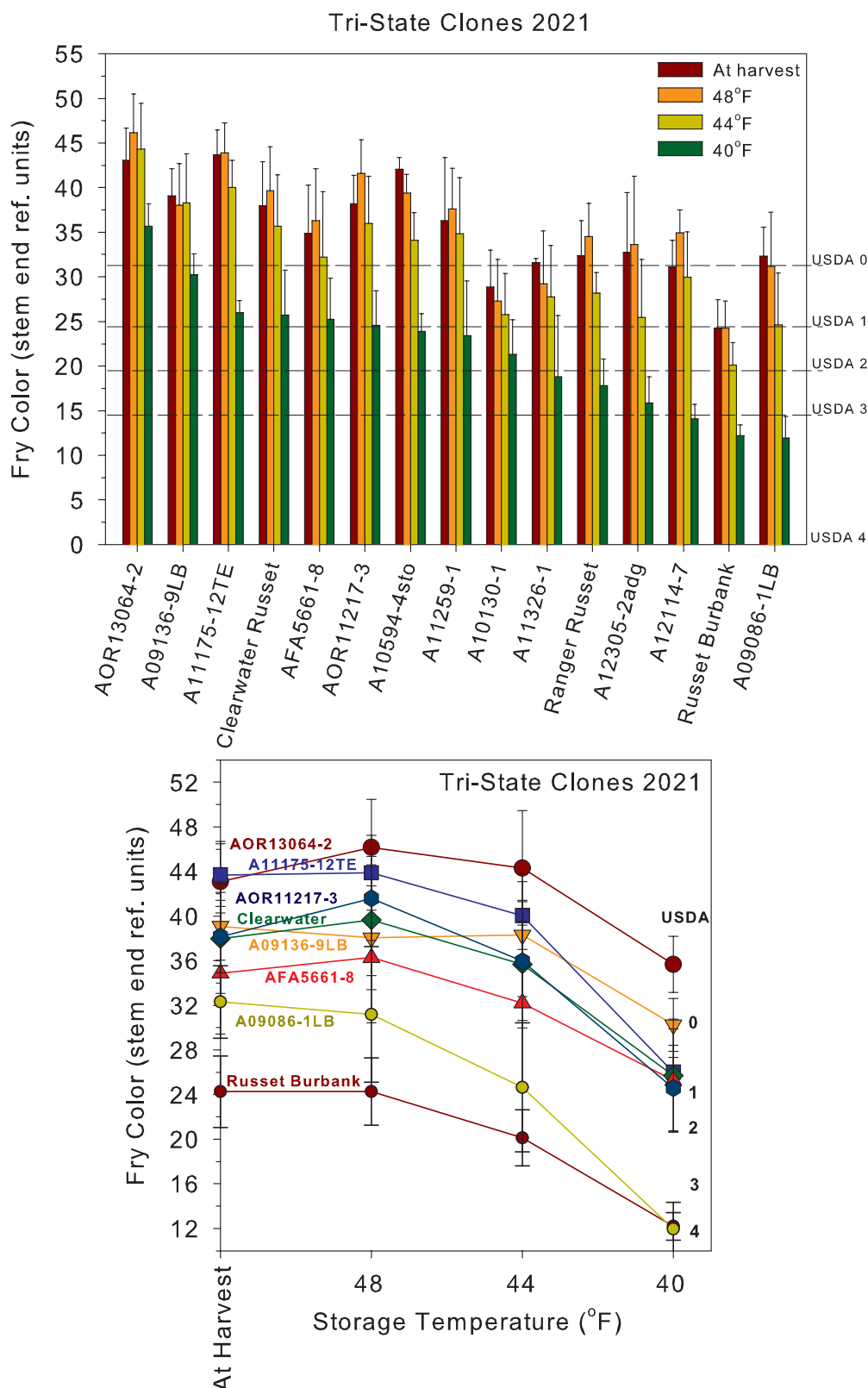
Diff = Absolute difference between stem and bud Photovolt reading.

Tri-State Trial - 3 state Average of Stem End

2021 Late Harvest Tri-State Trial



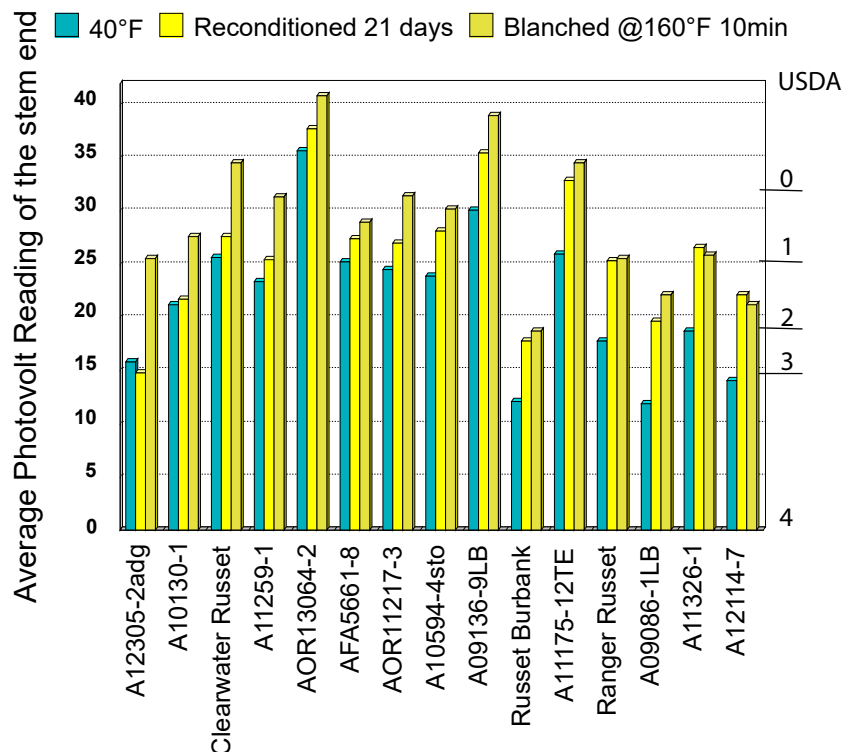
2021 Late Harvest Tri-State Trial



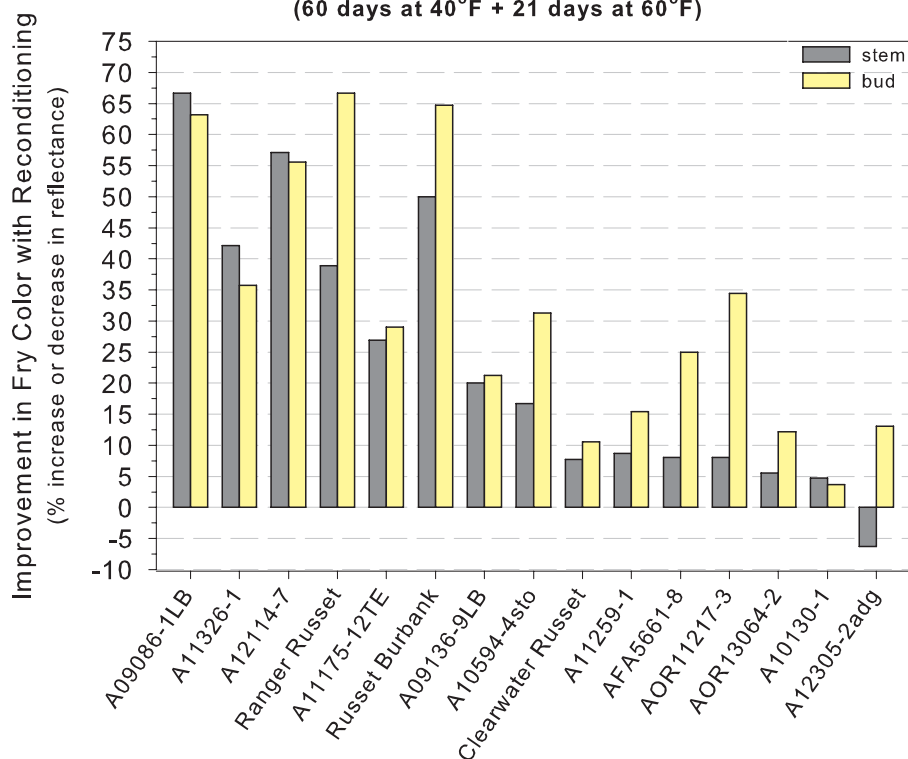
Top: At-harvest and after-storage French fry colors (stem end) of clones in the Tri-State Trial. Tubers were stored for 60 days at 48, 44, and 40°F. The clones are ranked from best to worst on fry color of the 40°F-stored tubers. High reflectance values indicate light colored fries.

Bottom: Line graph depicting the effects of storage temperature on change in French fry processing quality (stem end fry color) of the most cold sweetening resistant (AOR13064-2 and A09136-9LB) and susceptible (A09086-1LB and RB*) clones in the Tri-State Trial. *Indicates similar performance of the clones last year.

2021 Late Harvest Tri-State Trial



Reconditioning Ability - Tri-State Clones 2021 (60 days at 40°F + 21 days at 60°F)



Reconditioning abilities of clones in the 2021 Tri-State Trial (3-state averages). Clones were stored at 40°F for 60 days after harvest and then reconditioned at 60°F for 21 days. **Top:** Stem end fry color before and after reconditioning and blanching. Numbers on side indicate the USDA color rating of the stem end. **Bottom:** Percent improvement of stem and bud end fry color with reconditioning.

2021 Late Harvest Tri-State Trial

Length to Width Ratios of 8-10 oz Tubers

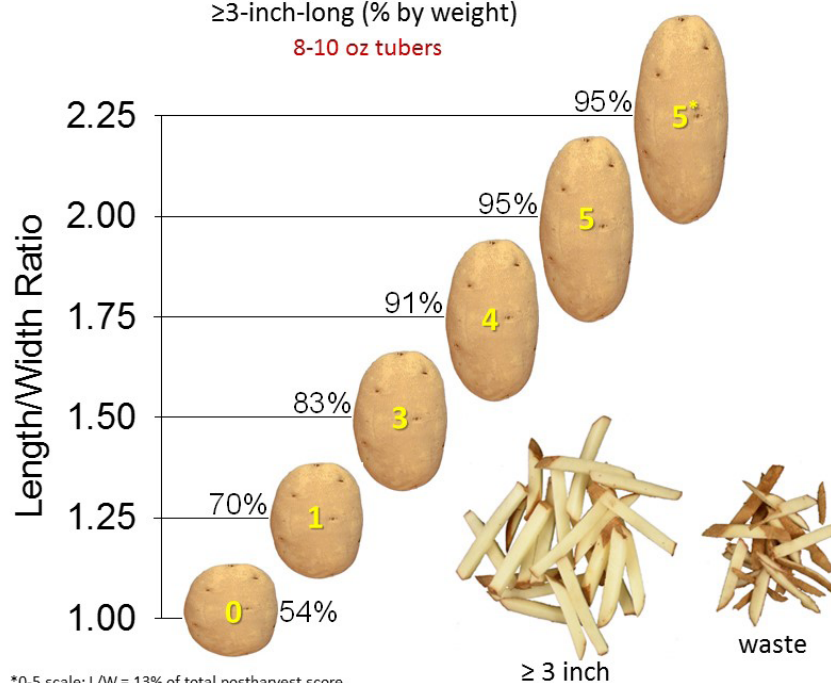
Clone	Length to width ratio						3 State Avg.
	WA	rtg \$	ID	rtg \$	OR	rtg \$	
1 Clearwater Russet	1.73	4	1.62	3	1.55	3	1.63
2 Ranger Russet	1.77	4	2.05	5	1.77	4	1.86
3 Russet Burbank	2.09	5	1.75	4	1.95	5	1.93
4 A09086-1LB	1.56	3	1.78	4	1.47	2	1.60
5 A09136-9LB	1.34	1	1.57	3	1.45	2	1.45
6 A10130-1	1.71	4	1.77	4	1.54	3	1.67
7 A10594-4sto	1.54	3	1.88	5	1.69	4	1.70
8 A11175-12TE	1.78	4	1.66	4	1.32	1	1.59
9 A11259-1	1.79	4	1.83	5	1.71	4	1.77
10 A11326-1	1.45	2	1.59	3	1.48	2	1.51
11 A12114-7	1.29	1	1.81	5	1.40	2	1.50
12 A12305-2adg	2.20	5	1.54	3	1.82	5	1.85
13 AFA5661-8	1.81	5	1.65	4	1.55	3	1.67
14 AOR11217-3	1.76	4	1.80	5	1.75	4	1.77
15 AOR13064-2	1.82	5	1.89	5	1.73	4	1.81
Average	1.71		1.75		1.61		1.69

Clone	Width to thickness ratio			3 State Avg.
	WA	ID	OR	
1 Clearwater Russet	1.22	1.13	1.24	1.20
2 Ranger Russet	1.18	1.17	1.24	1.20
3 Russet Burbank	1.24	1.17	1.25	1.22
4 A09086-1LB	1.22	1.16	1.20	1.19
5 A09136-9LB	1.27	1.12	1.26	1.22
6 A10130-1	1.21	1.10	1.15	1.16
7 A10594-4sto	1.18	1.15	1.19	1.18
8 A11175-12TE	1.14	1.12	1.18	1.15
9 A11259-1	1.14	1.08	1.14	1.12
10 A11326-1	1.15	1.12	1.17	1.14
11 A12114-7	1.17	1.08	1.15	1.13
12 A12305-2adg	1.12	1.13	1.15	1.14
13 AFA5661-8	1.10	1.10	1.14	1.12
14 AOR11217-3	1.18	1.13	1.22	1.17
15 AOR13064-2	1.15	1.10	1.15	1.13
Average	1.18	1.12	1.19	1.16

French Fry Yield vs Tuber L/W Ratio

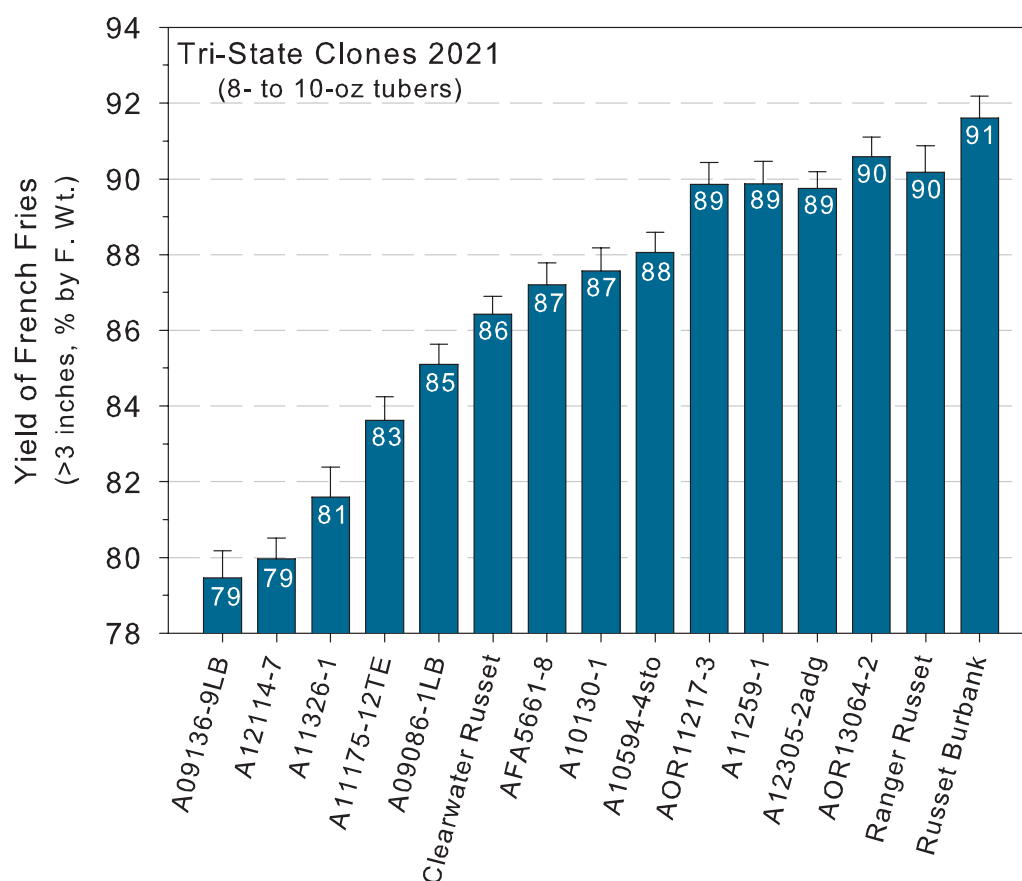
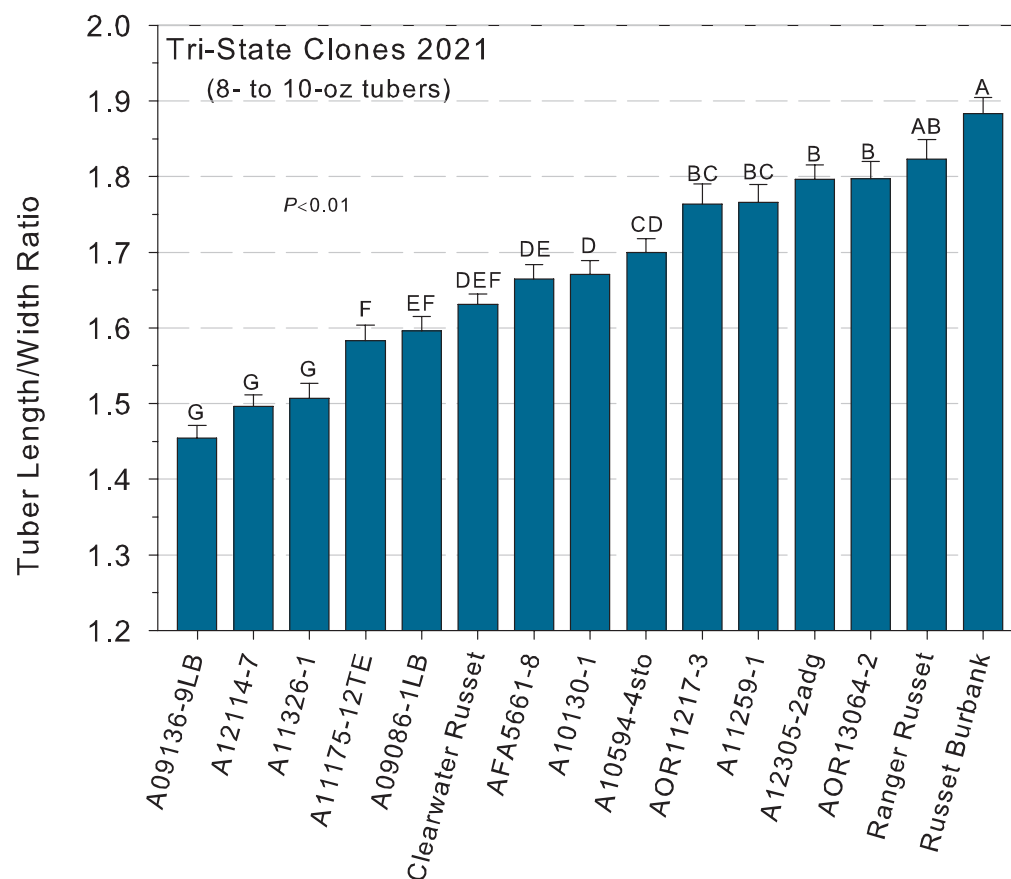
≥3-inch-long (% by weight)

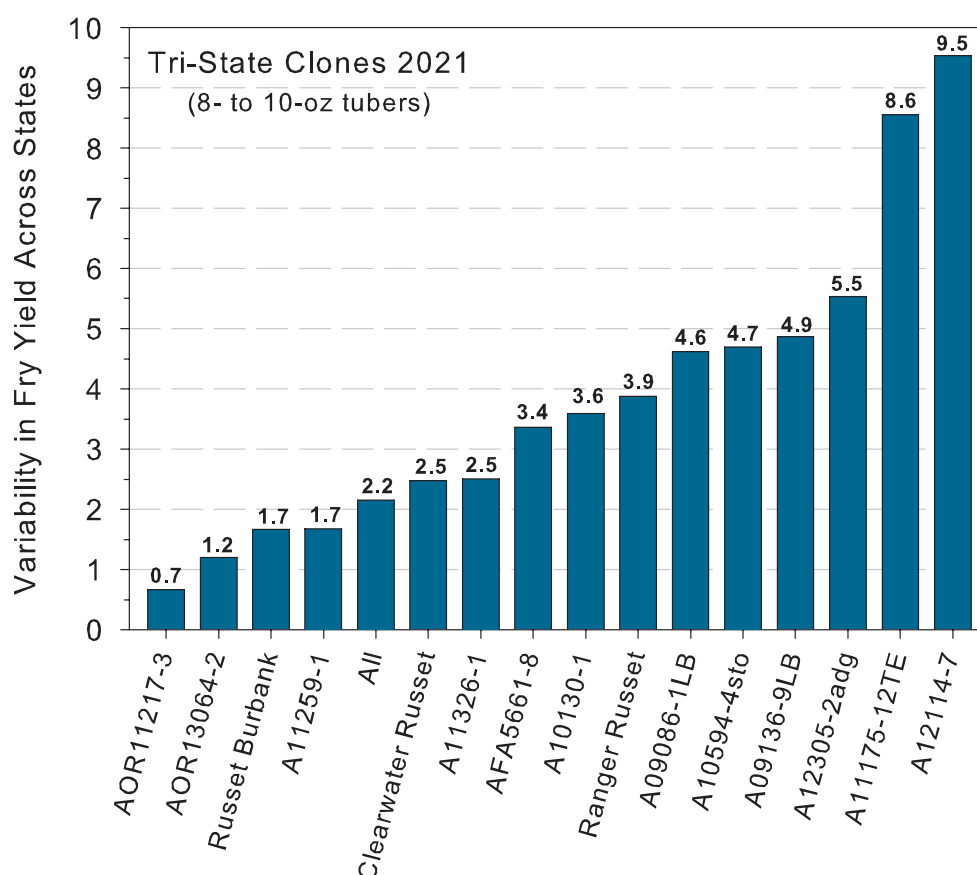
8-10 oz tubers



*0-5 scale; L/W = 13% of total postharvest score

2021 Late Harvest Tri-State Trial





Relative ranking of clones in the Late Season Tri-State Trial for variability in yield of French fries prepared from 8- to 10-oz tubers. Variability is expressed as the standard deviation (calculated across ID, WA and OR production sites) for the yield of fries ≥ 3 inches in length (% by fresh weight) from 8- to 10-oz tubers. High values reflect more variation in tuber shape and thus fry yield from state to state. For example, A12114-7 had a length to width ratio of 1.50, resulting in 79% of the tuber producing usable French fries ≥ 3 inches in length (page 54). However, tuber shape of this entry also varied the most across production sites (see above), resulting in fry yields ranging from 72 to 91% ($80 \pm 5.51\%$).

Pages 53-54: Tuber length to width ratios and the associated percentage yield of fries. Bars with same letter are not significantly different ($P \leq 0.01$).

2021 Early Harvest Regional Trial

Location: WSU Research Center – Othello, WA

Planting Date: March 31

Vine Kill Date: July 26

Harvest Date: August 9

Days Grown: 117

Regional trials are conducted throughout the western region of the United States, including Washington. Entries in the Regional Trial are chosen by a coordinating committee and are grown for both early (Early Regional) and full (Late Regional) season harvest. The 2021 early harvest trial compared 5 local reference varieties to 9 new clones on the WSU Othello Research Station. The following is a summary of the Washington field and post-harvest results. See also: grading comments and merit scores near front of book

Fresh Market Standout(s): POR12NCK50-1 and Russet Norkotah

Process Market Standout(s): POR12NCK50-1 and OR12133-10

Yield and Economic Data

➤ Total Yield and U.S. #1 Yield

Highest: TX13590-9Ru had the highest total yield (729 CWT/A) and the highest U.S. #1 yield (591 CWT/A). AOR10204-3 had the second highest total yield (671 CWT/A) and the second highest U.S. #1 yield (557 CWT/A).

Lowest: POR12NCK50-1 had the lowest total yield (494 CWT/A). Shepody had the second lowest total yield (508 CWT/A) and the lowest U.S. #1 yield (214 CWT/A).

➤ % U.S. #1's (greater than 4 oz)

Highest: POR12NCK50-1 (93%) and AOR10204-3 (83%).

Lowest: Shepody (42%) and Russet Burbank (48%).

➤ Carton Yield (100 to 50 Count (7 to 18 oz U.S. #1 Tubers))

Highest: AOR10204-3 (18.4 Tons/A) and POR12NCK50-1 (18.4 Tons/A).

Lowest: CO12378-1RU (3.4 Tons/A) and Shepody (5.1 Tons/A).

➤ Gross Return (\$/acre)

Fresh Market Highest: AOR10204-3 and TX13590-9Ru.

Fresh Market Lowest: Shepody, CO12378-1RU, and Russet Burbank.

Process Market Highest: TX13590-9Ru, AOR10204-3, and OR12133-10.

Process Market Lowest: Shepody, Russet Burbank, and CO12378-1RU.

2021 Early Harvest Regional Trial

Summaries

ENTRY	TOTAL YIELD						CARTON YIELD		PROCESS YIELD	
			US # 1's*		US # 2's*		100-50 count		US 1's and 2's	
	CWT/A	Tons/A	> 4 oz	% of Total Yield	> 4 oz	& < 4 oz	(US 1's 7-18 oz)		> 6 oz	
							% of Total Yield	Tons/A	% of Total Yield	Tons/A
Clearwater Russet	526	BC	26.3	76	1	22	43	8.7	43	11.2
Ranger Russet	587	ABC	29.4	69	13	18	42	8.6	55	16.3
Russet Burbank	529	BC	26.4	48	13	39	47	6.1	42	11.2
Russet Norkotah	563	BC	28.1	81	4	15	51	11.5	58	16.3
Shepody	508	C	25.4	42	24	33	48	5.1	46	11.6
AOR08540-1	606	ABC	30.3	65	12	23	39	7.6	48	14.8
AOR10204-3	671	AB	33.5	83	6	10	66	18.4	76	25.4
CO10085-1RU	553	BC	27.6	63	0	36	30	5.4	31	8.8
CO11009-3RU	555	BC	27.7	76	4	20	48	10.2	55	15.4
CO12378-1RU	522	BC	26.1	64	1	35	20	3.4	26	6.8
COA11013-2	607	BC	30.4	62	3	34	32	6.1	37	11.1
OR12133-10	662	AB	33.1	76	8	16	51	12.8	58	19.0
POR12NCK50-1	494	C	24.7	93	1	6	79	18.0	83	20.4
TX13590-9Ru	729	A	36.4	81	5	14	52	15.3	59	21.7

ENTRY	US # 1 YIELD						> 4 oz	INTERNAL DEFECTS (%)		
	> 4 oz		> 4 oz	4-7 oz*	7-14 oz*	> 14 oz*	SPECIFIC	(8-12 oz tubers)		
	CWT/A	STATS**	Tons/A	----- % -----			GRAVITY	% HH	% BC	% IBS
Clearwater Russet	403	BCD	20.1	57	41	2	1.082	0	0	0
Ranger Russet	406	BCD	20.3	58	39	4	1.075	0	0	3
Russet Burbank	257	DE	12.8	53	46	1	1.071	0	3	0
Russet Norkotah	453	ABC	22.7	49	48	3	1.071	0	0	0
Shepody	214	E	10.7	52	48	0	1.068	0	0	3
AOR08540-1	392	BCD	19.6	61	38	1	1.080	0	0	0
AOR10204-3	557	AB	27.9	30	60	10	1.071	0	0	0
CO10085-1RU	354	CDE	17.7	70	29	1	1.081	0	0	0
CO11009-3RU	425	ABCD	21.3	52	44	4	1.086	0	0	0
CO12378-1RU	336	CDE	16.8	80	20	0	1.080	0	0	0
COA11013-2	377	CDE	18.9	68	31	1	1.067	0	0	0
OR12133-10	505	ABC	25.2	47	49	3	1.075	0	0	3
POR12NCK50-1	459	ABC	22.9	20	68	11	1.082	0	0	0
TX13590-9Ru	591	A	29.5	47	51	2	1.077	0	0	0

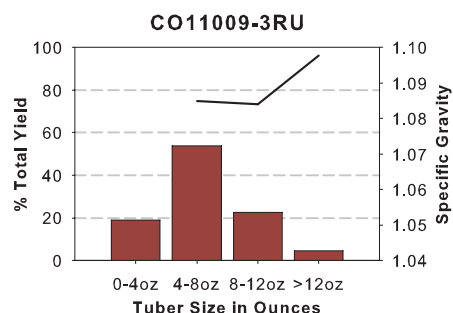
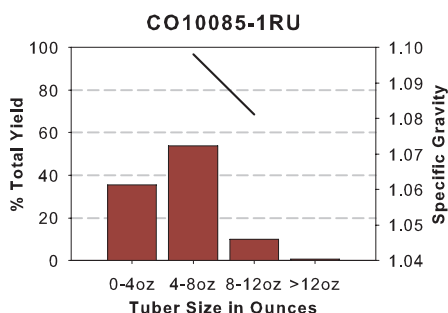
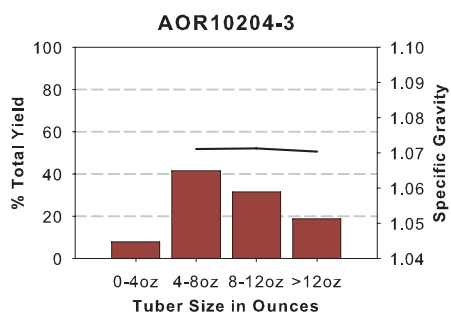
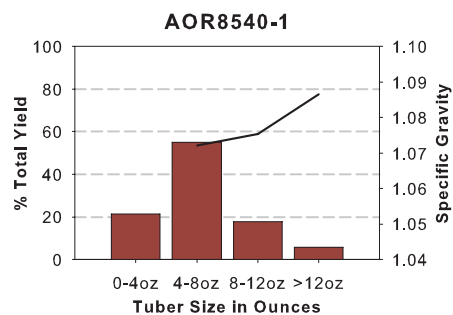
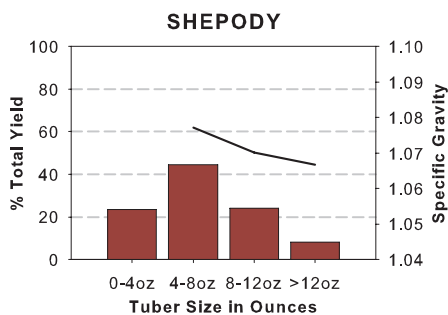
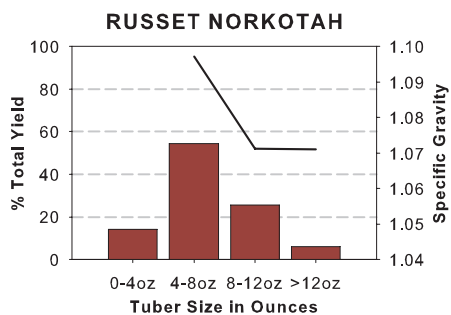
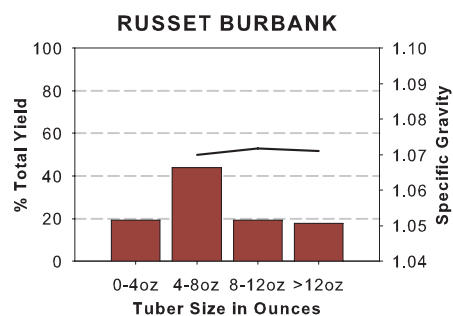
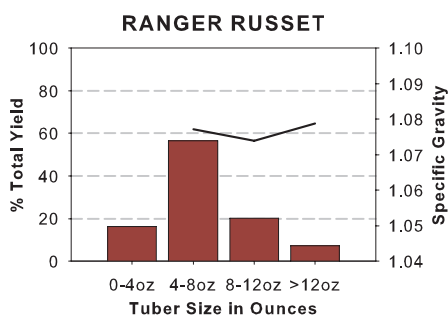
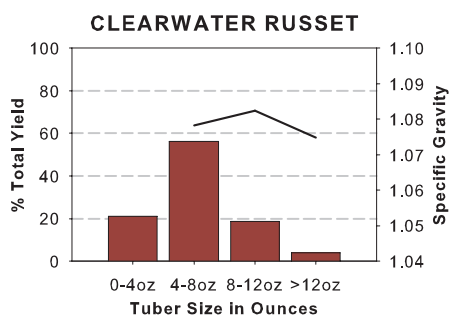
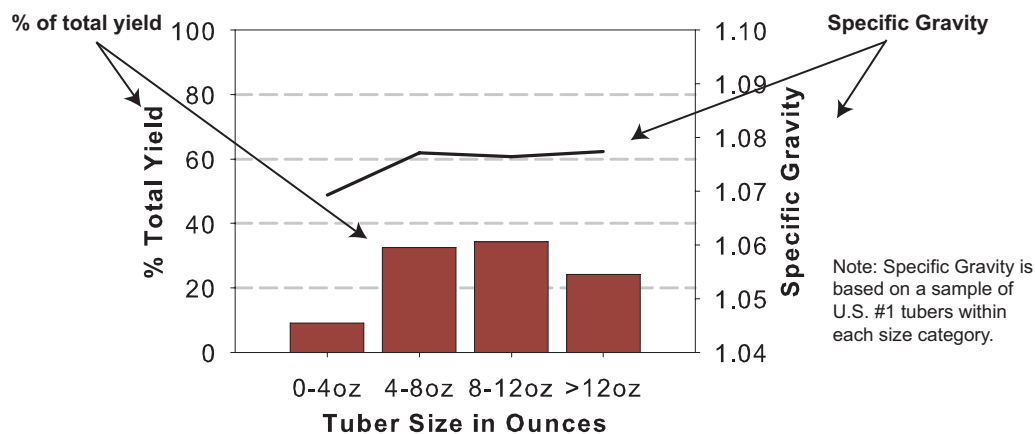
ENTRY	40 DAY	50 DAY	TUBER	STEMS PER	AVERAGE TUBER		SKIN	TUBER	BRUISE (%)	
	STAND	STAND	GREENING	PLANT	WEIGHT	NUMBER	SET	SHAPE	(8-12 oz tubers)	
	% Emerged	% Emerged	% Total Yield	Above Ground	Ounces	Tubers/Plant	1 = Poor 5 = Good	1 = Round 5 = Long	BLACKSPOT	SHATTER
Clearwater Russet	29	93	1	2.4	5.0	10.4	3.0	3.0	0	0
Ranger Russet	67	100	2	2.8	5.4	10.6	3.0	4.0	3	17
Russet Burbank	40	96	3	2.5	5.6	9.3	2.0	4.0	3	13
Russet Norkotah	56	91	7	3.0	5.6	9.9	3.7	4.0	0	13
Shepody	49	98	18	2.0	5.1	9.9	3.0	4.0	0	10
AOR08540-1	51	96	14	2.8	5.1	11.7	3.3	4.0	3	14
AOR10204-3	33	100	2	2.6	7.0	9.4	2.7	3.0	0	13
CO10085-1RU	96	100	0	2.5	4.2	12.9	3.0	2.0	13	3
CO11009-3RU	71	98	1	3.6	5.3	10.2	3.7	3.0	0	13
CO12378-1RU	73	98	0	3.0	4.1	12.4	5.0	3.0	0	60
COA11013-2	78	98	10	2.7	4.3	13.8	3.0	4.0	3	13
OR12133-10	78	98	14	2.5	5.7	11.4	3.0	3.7	0	23
POR12NCK50-1	29	89	1	1.8	8.1	6.0	3.7	4.0	0	27
TX13590-9Ru	76	98	3	3.6	5.8	12.2	3.0	2.0	2	8

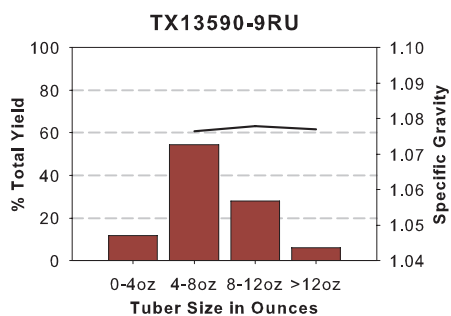
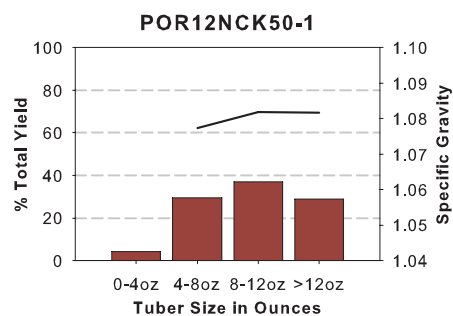
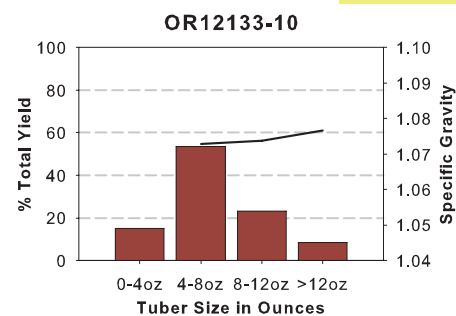
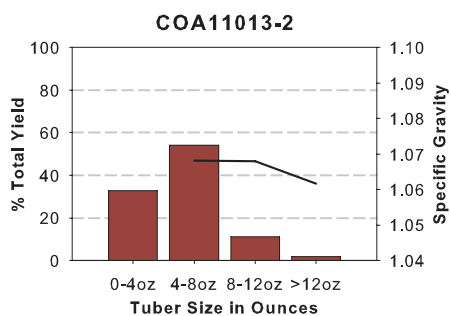
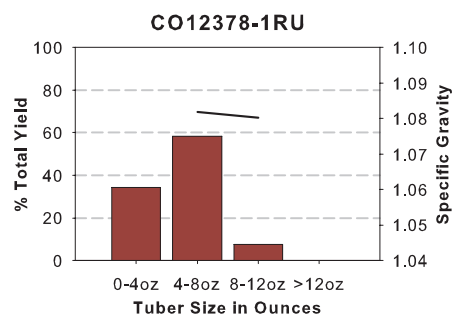
* Percent values may not total 100% due to rounding

2021 Early Harvest Regional Trial

Tuber Yield and Specific Gravity Distributions

12 inch In-Row Spacing





2021 Early Harvest Regional Trial

Tubers

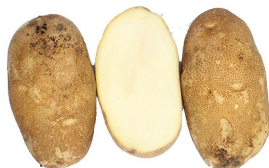
Clearwater Russet



Ranger Russet



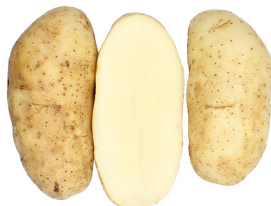
Russet Burbank



Russet Norkotah



Shepody



AOR08540-1



AOR10204-3



CO10085-1RU



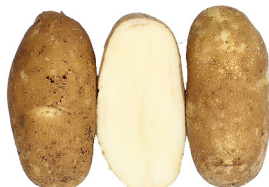
CO11009-3RU



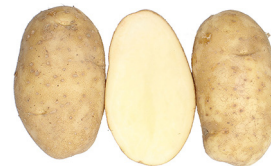
CO12378-1RU



COA11013-2



OR12133-10



POR12NCK50-1



TX13590-9Ru



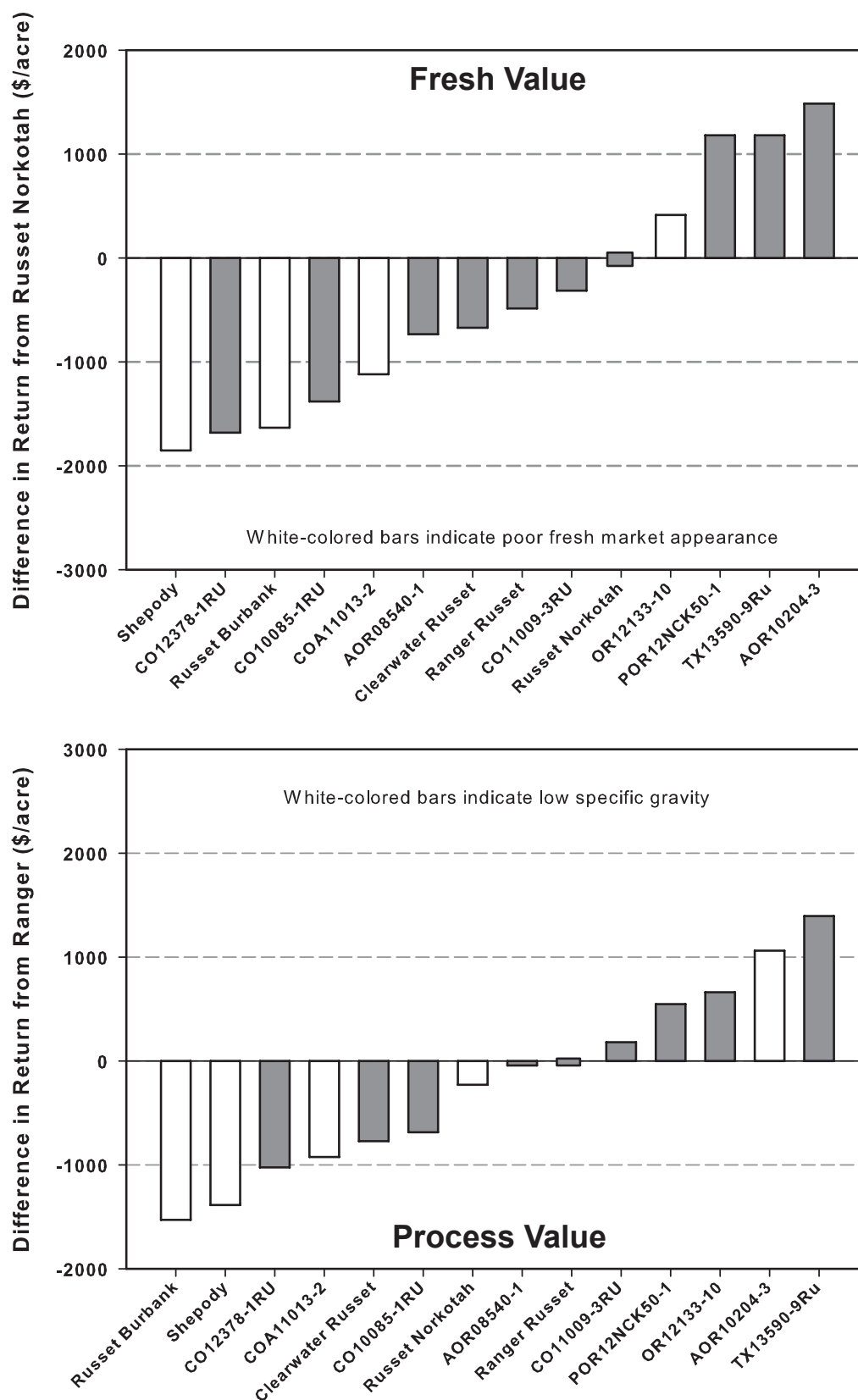


Figure 1 (top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to the undesirable shape or appearance. **Figure 2 (bottom).** Difference in gross return per acre (Process Market) from Ranger Russet calculated by subtracting the gross return of Ranger Russet from the gross return of the particular entry.

2021 Late Harvest Regional Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 4

Vine Kill Date: August 30

Harvest Date: September 13

Days Grown: 148

Regional trials are conducted throughout the western region of the United States, including Washington. Entries in the Regional Trial are chosen by a coordinating committee and are grown for both early (Early Regional) and full (Late Regional) season harvest. This year's trial included 4 local reference varieties and 9 new clones. The following is a summary of the Washington field and post harvest results. See also: grading comments and merit scores near front of the book.

Fresh Market Standout(s): POR12NCK50-1 and Russet Norkotah

Process Market Standout(s): POR12NCK50-1

Yield and Economic Data

➤ Total Yield and U.S. #1 Yield

Highest: OR12133-10 had the highest total yield (1214 CWT/A) and the second highest U.S. #1 yield (937 CWT/A). TX13590-9Ru had the second highest total yield (1180 CWT/A) and the highest U.S. #1 yield (937 CWT/A).

Lowest: POR12NCK50-1 had the lowest total yield (781 CWT/A). Ranger Russet had the lowest U.S. #1 yield (322 CWT/A).

➤ % U.S. #1's (greater than 4 oz)

Highest: POR12NCK50-1 (85%) and Clearwater Russet (82%).

Lowest: Ranger Russet (30%) and Russet Burbank (32%).

➤ Carton Yield (100 to 50 Count (7 to 18 oz U.S. #1 Tubers))

Highest: TX13590-9Ru (34.9 Tons/A) and OR12133-10 (34.4 Tons/A).

Lowest: Ranger Russet (8.5 Tons/A) and Russet Burbank (9.1 Tons/A).

➤ Gross Return (\$/acre)

Fresh Market Highest: TX13590-9Ru and OR12133-10.

Fresh Market Lowest: Ranger Russet, Russet Burbank, and AOR08540-1.

Process Market Highest: OR12133-10 and CO11009-3RU.

Process Market Lowest: Russet Burbank, Russet Norkotah, and POR12NCK50-1.

2021 Late Harvest Regional Trial

Postharvest Information

The 2021 trial evaluated 6 clones along with Clearwater Russet, Russet Burbank, and Ranger Russet as check cultivars from each growing location (WA, ID, & OR). When averaged across states, all entries received higher overall postharvest scores than Russet Burbank. An “*” in the summary below indicates similar performance and/or ranking in trials from previous years.

➤ Overall Postharvest Ratings

Highest scoring clones: CO11009-3RU*, CO12378-1RU, Clearwater Russet*

Lowest scoring clones: AOR08540-1, Russet Burbank*

➤ Low Temperature Sweetening

Most resistant: CO11009-3RU*, CO12378-1RU, Clearwater Russet*

Most susceptible: POR12NCK50-1, Russet Burbank*, AOR0540-1*

➤ Tuber asparagine content (WA Regional Trial samples)

Highest concentration: Russet Burbank, Ranger Russet

Lowest concentration: CO11009-3RU*, CO10085-1RU

➤ French Fry Taste Panel

Highest rated: CO11009-3RU*, CO12378-1RU, Clearwater Russet*

Lowest rated: Russet Burbank*, AOR08540-1*, OR12133-10

➤ Blackspot Bruise Susceptibility

Most resistant: CO12378-1RU, CO10085-1RU, Clearwater Russet, AOR08540-1*

Most susceptible: OR12133-10*, Ranger Russet*

➤ Variability in Tuber Shape & Fry Yield (8- to 10-oz tubers)

Lowest L/W: CO12378-1RU, CO10085-1RU, Clearwater Russet, POR12NCK50-1

Highest L/W: Russet Burbank*, AOR08540-1, Ranger Russet*

Lowest W/Th: AOR08540-1, CO110099-3RU

Highest W/Th: CO12378-1RU, CO10085-1RU

Least variable: AOR08540-1, OR12133-10, Russet Burbank

Most variable: CO12378-1RU, POR12NCK50-1, CO10085-1RU*

Details

- CO11009-3RU*, CO12378-1RU, and Clearwater Russet* were the highest rated entries, scoring 34.6, 31.8, and 28.0 points of 38 possible points, respectively. Overall scores (range and average across clones) were on par with last year.
- AOR08540-1 and Russet Burbank* scored the lowest on the overall postharvest performance with 18.1 and 14.8 of 38 possible points. COA11013-2 exhibited after cooking darkening (ACD) during storage in the 2020 season. ACD was evaluated closely during the ‘at-harvest’ assessments, and it was observed in all three state samples.
- CO11009-3RU* and CO12378-1RU were the most resistant to cold sweetening, producing USDA 0 fries (stem end) when stored for 60 days at 40°F averaged across locations. POR12NCK50-1*, Russet Burbank*, and AOR0540-1* were susceptible to LTS, producing USDA 3-4 fries after 60 days at 40°F.
- Russet Burbank (100%) had the highest concentration of asparagine (asn) (acrylamide precursor) followed by Ranger Russet (96.7%) and then Clearwater Russet (86.2%). CO11009-3RU* (24.2%) and CO10085-1RU (47%) produced the lowest concentration of asn. However, CO10085-1RU is cold sweetening susceptible and therefore would likely not have a low acrylamide forming phenotype when stored cold. By contrast, CO11009-3RU* was resistant to cold sweetening, which when coupled with its low asn concentration would limit acrylamide formation during processing. Low asparagine and reducing sugars are indicators of low acrylamide forming potential.

- Average (across states) gravities of Russet Burbank* were the lowest, 1.073, too low for frozen process contracts. The gravities of the other entries ranged from 1.080 to 1.086 when averaged across states. When averaged across the six entries, gravities were 1.082 (WA), 1.086 (ID), and 1.078 (OR). Gravities from OR were the lowest and ranged from 1.072 to 1.083. Over all locations, Ranger Russet and CO11009-3RU* had the highest gravities (1.086; span= 1.080-1.090 & 1.083-1.093). Specific gravity span was estimated by floating potatoes in brine tanks to estimate the span of gravities within a sample.
- CO11009-3RU*, CO12378-1RU, and Clearwater Russet* were the favorites in the taste panels, scoring 3.8/5 on average across growing locations (5 is best). Russet Burbank*, AOR08540-1*, and OR12133-10 received the lowest taste panel score of 2.8 on average.
- On average, tubers grown in OR produced the lightest fry colors at harvest and post-storage regardless of storage temperature. The Regional experimental entries from all locations averaged 86% and 79% of their at-harvest process quality (stem end fry color) when stored at 48°F and 44°F for 60 days, respectively.
- For the WA trial, 2/6 entries at harvest, 2/6 stored at 48°F, 4/6 entries stored at 44°F, and 1/6 entries stored at 40°F produced non-uniform fry color (bud to stem end photovolt difference >9). With the exception of one entry stored at 44°F from OR, all entries from ID and OR produced uniformly light fries. The top-rated entries, CO11009-3RU*, CO12378-1RU maintained fry color regardless of production site (WA, ID, OR) and storage temperature (48, 44, 40°F) after 60 days except for CO11009-3RU at 40°F. CO11009-3RU maintained uniform color in 2020.
- Retention of process quality during storage of OR12133-10, CO10085-1RU, and Clearwater Russet at 44°F (60 days) was highly variable across production sites. By contrast, growing location had the least effect on the change in fry color of CO12378-1RU, AOR08540-1*, and Russet Burbank following 60 days at 44°F.
- Ranger Russet*, CO12378-1RU, and POR12NCK50-1* showed the greatest photovolt improvement in stem end fry color when reconditioned at 60°F following storage for 60 days at 40°F. Reconditioning tubers of CO11009-3RU, AOR08540-1, and Clearwater Russet* had the least effect on change in stem end fry color. Ranger Russet and OR12133-10 appeared more susceptible to sugar end development based on attenuated reconditioning of the stem versus bud end of tubers following storage at 40°F. Additionally in 2021, the fry color recovery was assessed by blanching potato strips prior to frying. Clearwater Russet, CO12378-1RU, and CO11009-3RU benefited the most and recovered 85-87% initial stem end fry color at harvest. Blanching had the least effect on POR12NCK50-1 and AOR08540-1. When averaged for location and entry, stem end color recovery was equivalent in blanched samples to reconditioned samples (ca. 77% initial harvest color) for the Regional trial.
- CO12378-1RU, CO10085-1RU, Clearwater Russet, and AOR08540-1* were resistant to blackspot bruise and averaged 2-12% (stem end) in the controlled impact study (3-state average). These entries also scored lowest in bruise severity, averaging 1.17/5 (1 = no bruise; 5 = 100% of impact area is dark). OR12133-10* and Ranger Russet* were highly susceptible, averaging 85.5% bruise. Bruise severity was also greatest in these two entries (average 3.55/5).
- ID grown tubers (8-10 oz) had the highest L/W ratios (1.84) compared to those grown in OR (1.68) and WA (1.74). CO12378-1RU, CO10085-1RU, Clearwater Russet, and POR12NCK50-1 had the lowest L/W ratios (avg. 1.61), reflecting a rounder tuber shape phenotype. Russet Burbank*, AOR08540-1, and Ranger Russet* had the highest L/W ratios (1.87-1.94). CO12378-1RU, POR12NCK50-1, and CO10085-1RU* showed the greatest variation in L/W ratio 8- to 10-oz tubers across production sites. By contrast, the L/W ratios of AOR08540-1, OR12133-10, and Russet Burbank were the least affected by the growing region. Additionally in 2021, the width to thickness (W/Th) ratio was measured. The average difference in W/Th was minimal (max. 0.1) among all entries and production sites. AOR08540-1 and CO11009-3RU had the most consistent diameter (1.15 & 1.16) and CO12378-1RU and CO10085-1RU were the least consistent (1.23 & 1.25).
- Following 60 days at 48°F, 100% of OR12133-10 tubers were sprouting with an average sprout length of 2.3 inches indicating a relatively short dormancy (Ranger = 56% with 0.6-inch sprouts). By contrast, no tubers had sprouted in Russet Burbank* and 6.7% of tubers of POR12NCK50-1 had sprouted (0.1-inch average). Sprouts were observed in OR samples of CO10085-1RU as early as October.
- After 7-months of storage (3 months at 48°F = 4 months at 44°F), sprout lengths ranged from 1.50 to 13.0 inches depending on the clone and state. COA11013-2 and CO10085-1RU produced the longest sprouts (avg. 12.0 & 11.7 inches), indicating a short dormancy. By contrast, Clearwater Russet averaged 1.5-inch

sprouts and AOR08540-1 average 2.5-inch sprouts which indicates a longer dormancy than Russet Burbank (3.0-inch sprouts).

- Corky ringspot was observed in CO10085-1RU in the ID & OR samples.

Overall Regional Postharvest Merit Scores

Clone	Postharvest Merit Scores			3 state Average
	WA	ID	OR	
6 CO11009-3RU*	4.6	4.5	4.6	4.6
7 CO12378-1RU	4.3	No Sample	4.1	4.2
1 Clearwater Russet*	3.0	4.3	3.8	3.7
9 POR12NCK50-1*	3.1	3.7	3.3	3.4
2 Ranger Russet*	2.4	3.6	2.9	3.0
5 CO10085-1RU*	1.9	3.6	3.2	2.9
8 OR12133-10	2.4	3.2	3.1	2.9
4 AOR08540-1	2.1	2.4	2.6	2.4
3 Russet Burbank*	1.4	1.9	2.5	1.9

* similar results to 2020

2021 Late Harvest Regional Trial

Summaries

ENTRY	TOTAL YIELD						CARTON YIELD		PROCESS YIELD	
	CWT/A	STATS**	Tons/A	US # 1's*	US # 2's*	Culls*	100-50 count		US 1's and 2's	
				> 4 oz	> 4 oz	& < 4 oz	(US 1's 7-18 oz)		> 6 oz	
				% of Total Yield			% of Total Yield	Tons/A	% of Total Yield	Tons/A
Clearwater Russet	1010	ABCD	50.5	82	7	12	55	27.6	74	37.7
Ranger Russet	1087	ABC	54.3	30	44	26	16	8.5	64	34.9
Russet Burbank	1026	ABC	51.3	32	36	32	18	9.1	59	29.8
Russet Norkotah	895	CD	44.7	79	5	16	55	24.8	72	32.4
AOR08540-1	1137	AB	56.9	40	39	22	24	13.4	69	39.6
AOR10204-3	1073	ABC	53.7	75	16	9	61	33.0	84	45.0
CO10085-1RU	1027	ABC	51.4	74	10	16	47	24.2	67	34.8
CO11009-3RU	1069	ABC	53.4	72	17	11	48	25.7	77	41.2
CO12378-1RU	932	BCD	46.6	80	5	15	51	23.9	67	31.3
COA11013-2	1166	AB	58.3	65	18	18	40	23.3	64	37.4
OR12133-10	1214	A	60.7	77	14	9	57	34.4	81	49.5
POR12NCK50-1	781	D	39.0	85	7	8	57	22.3	89	34.6
TX13590-9Ru	1180	AB	59.0	79	11	10	59	34.9	81	47.9

ENTRY	US # 1 YIELD						> 4 oz	INTERNAL DEFECTS (%)		
	> 4 oz		> 4 oz	4-7 oz*	7-14 oz*	> 14 oz*	SPECIFIC GRAVITY	(8-12 oz tubers)		
	CWT/A	STATS**	Tons/A	----- % -----				% HH	% BC	% IBS
Clearwater Russet	825	AB	41.2	29	55	17	1.080	0	0	7
Ranger Russet	322	D	16.1	44	49	7	1.081	0	0	3
Russet Burbank	324	D	16.2	39	48	12	1.070	3	6	3
Russet Norkotah	706	AB	35.3	26	59	15	1.064	0	0	3
AOR08540-1	458	CD	22.9	26	48	26	1.074	8	0	0
AOR10204-3	803	AB	40.1	12	64	23	1.070	0	0	0
CO10085-1RU	763	AB	38.1	31	57	12	1.083	3	0	0
CO11009-3RU	765	AB	38.3	23	56	21	1.083	14	0	6
CO12378-1RU	745	AB	37.3	34	55	12	1.084	0	0	3
COA11013-2	753	AB	37.6	36	57	8	1.068	0	0	33
OR12133-10	932	A	46.6	18	58	24	1.075	0	3	3
POR12NCK50-1	663	BC	33.1	6	43	51	1.080	0	0	0
TX13590-9Ru	937	A	46.9	17	58	26	1.071	3	0	3

ENTRY	40 DAY	50 DAY	STEMS PER	TUBER	AVERAGE TUBER		SKIN	TUBER	BRUISE (%)	
	STAND	STAND	PLANT	GREENING	WEIGHT	NUMBER	SET	SHAPE	(8-12 oz tubers)	
	% Emerged	% Emerged	Above Ground	% Total Yield	Ounces	Tubers/Plant	1 = Poor 5 = Good	1 = Round 5 = Long	BLACKSPOT	SHATTER
Clearwater Russet	38	98	2.4	2	7.4	12.3	4.0	3.3	7	27
Ranger Russet	88	98	2.8	3	8.1	12.1	3.0	4.0	24	18
Russet Burbank	75	98	2.3	3	8.8	10.5	3.0	4.0	6	28
Russet Norkotah	86	97	2.4	5	7.3	11.0	4.0	3.0	0	13
AOR08540-1	41	94	2.8	13	8.3	12.3	3.3	4.0	0	41
AOR10204-3	41	95	2.7	2	9.3	10.3	2.8	3.0	0	8
CO10085-1RU	83	97	3.0	2	6.4	14.4	2.8	2.3	0	23
CO11009-3RU	83	97	3.0	4	8.1	11.9	4.0	3.0	3	29
CO12378-1RU	61	94	3.0	1	6.2	13.6	4.0	3.0	0	91
COA11013-2	91	97	3.0	6	6.5	16.2	4.0	4.0	0	17
OR12133-10	81	100	2.6	4	8.5	12.8	4.0	3.0	13	55
POR12NCK50-1	5	94	1.7	5	11.5	6.1	4.0	3.0	4	67
TX13590-9Ru	88	95	3.8	2	8.3	12.8	3.5	2.0	11	51

* Percent values may not total 100% due to rounding

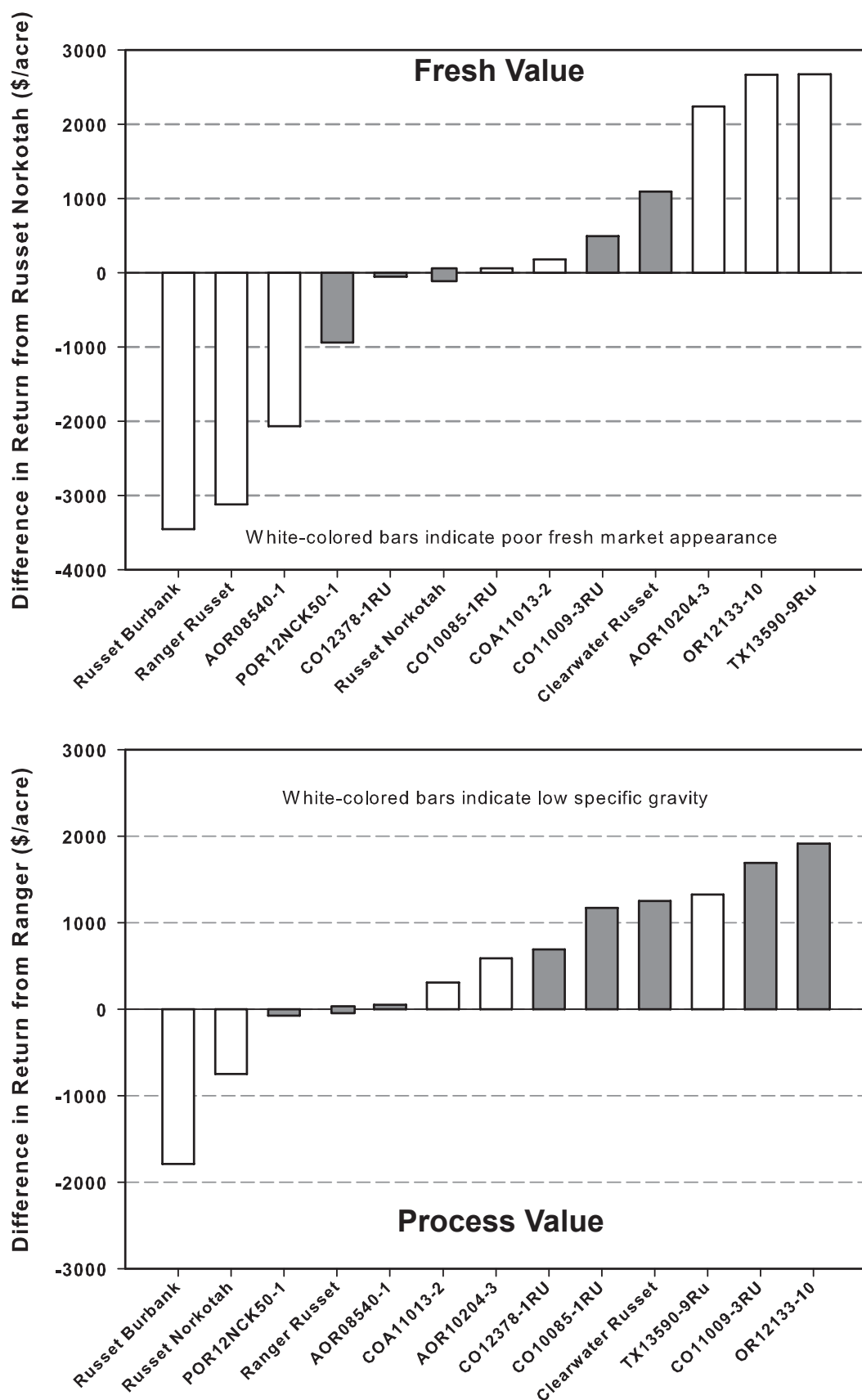
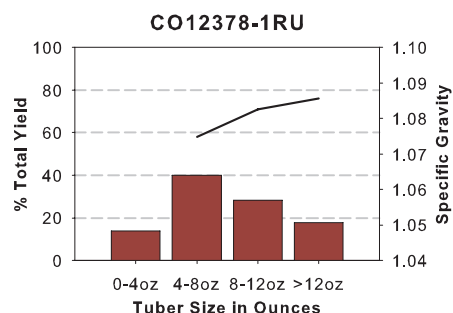
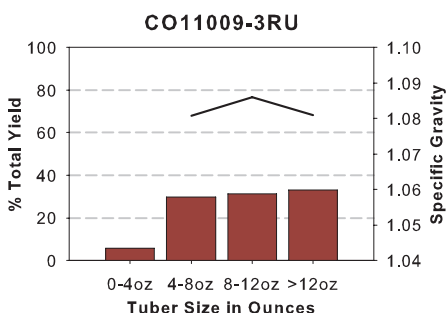
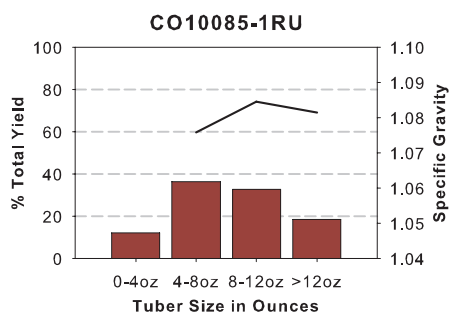
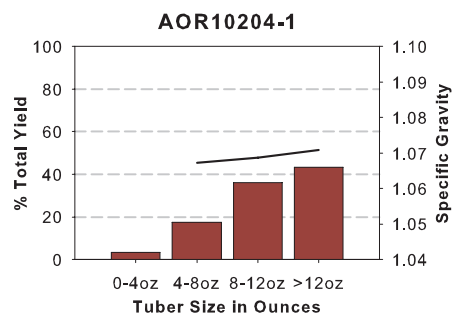
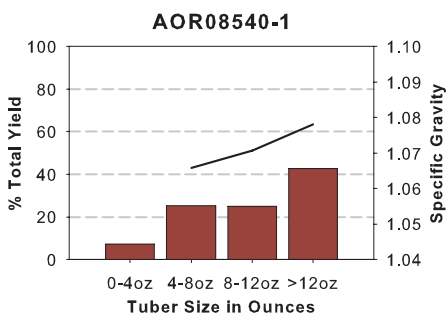
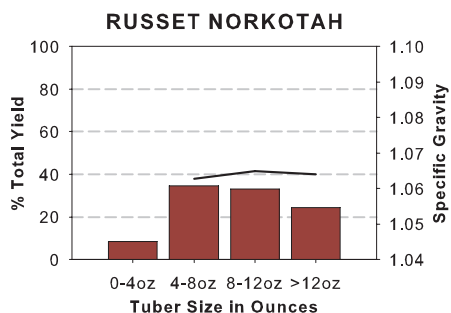
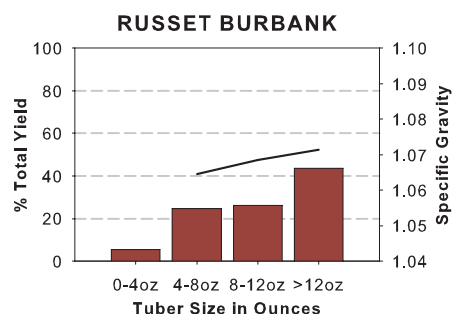
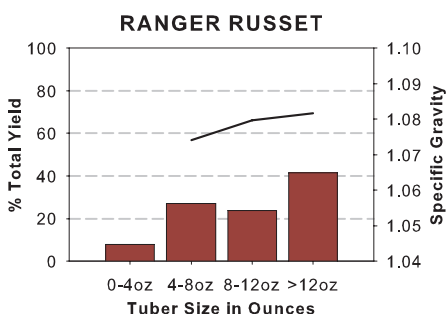
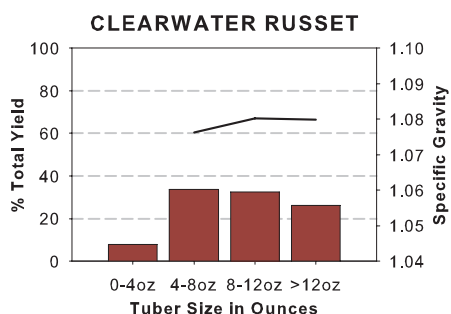
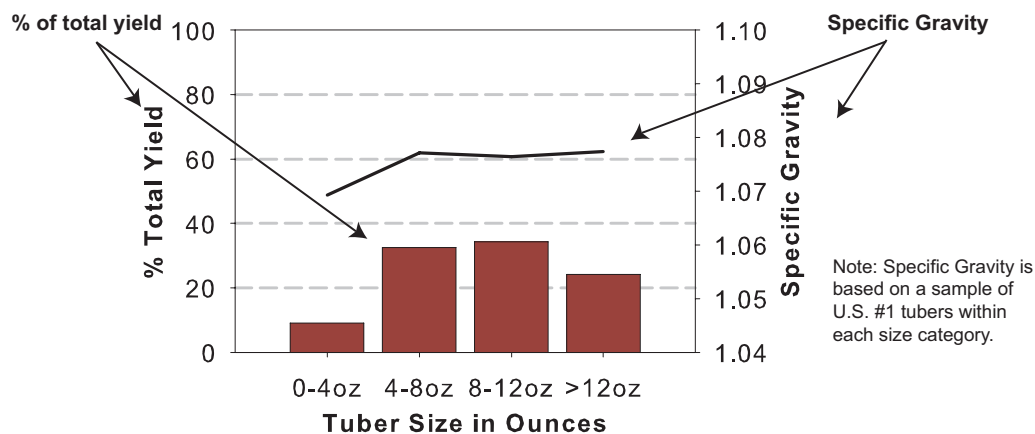


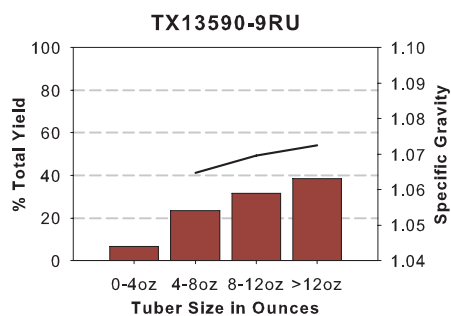
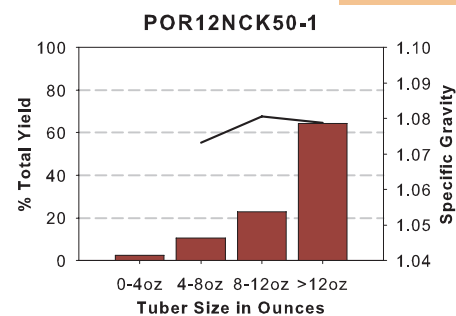
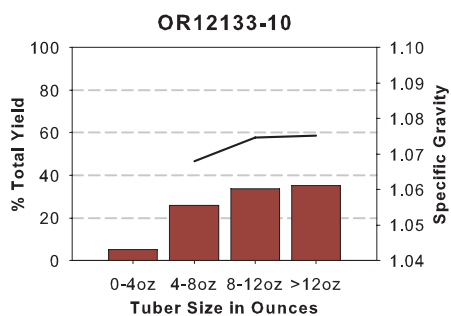
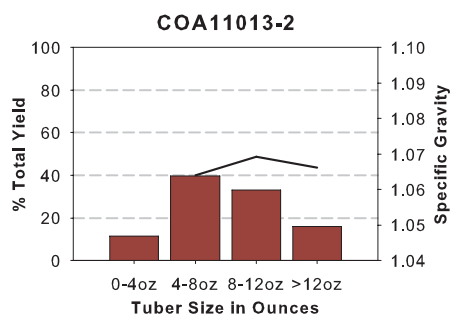
Figure 1 (top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to the undesirable shape or appearance. **Figure 2 (bottom).** Difference in gross return per acre (Process Market) from Ranger Russet calculated by subtracting the gross return of Ranger Russet from the gross return of the particular entry.

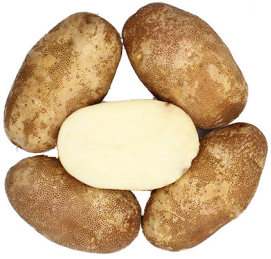
2021 Late Harvest Regional Trial

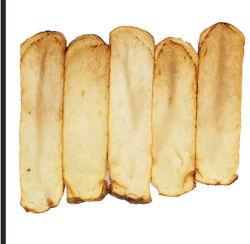
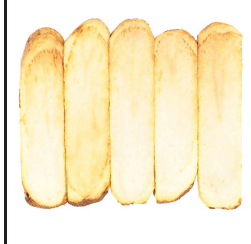
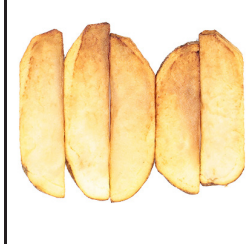
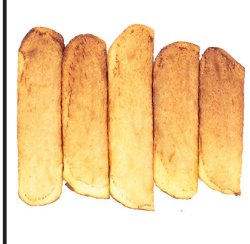
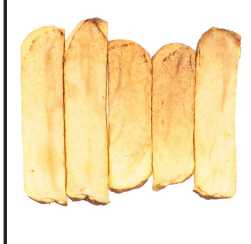
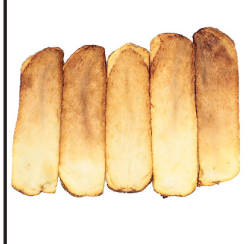
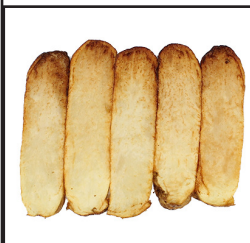
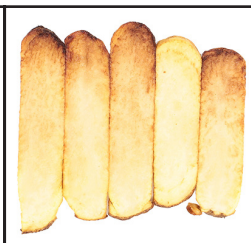
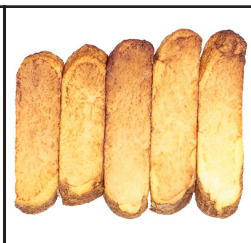
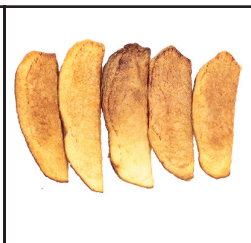
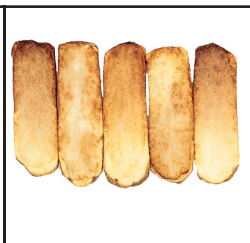
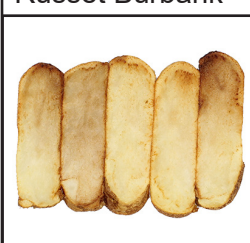
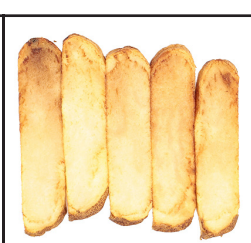
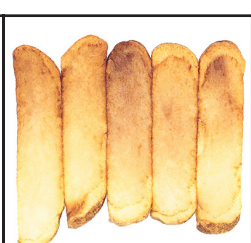
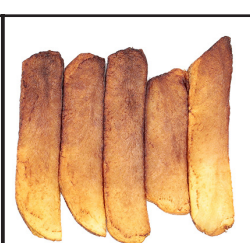
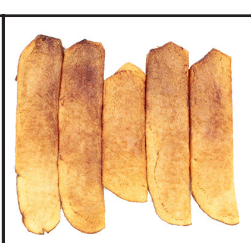
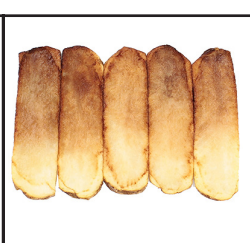
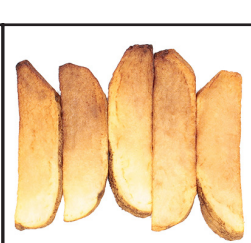
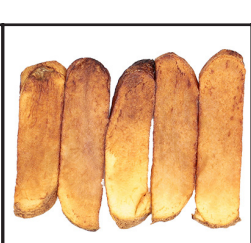
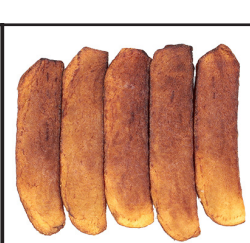
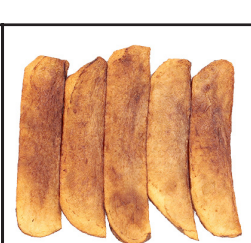
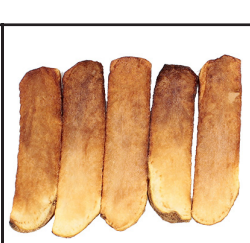
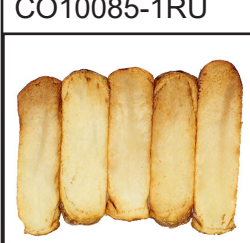
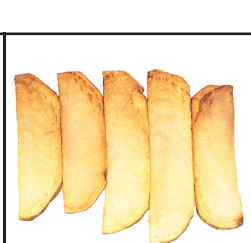
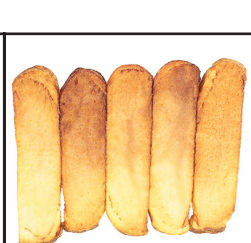
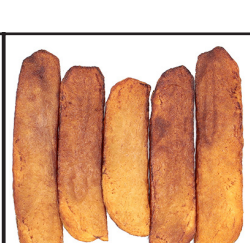
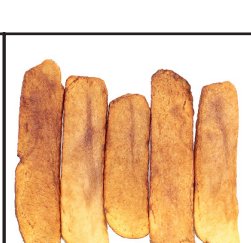
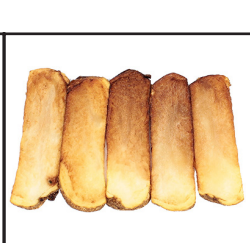
Tuber Yield and Specific Gravity Distributions

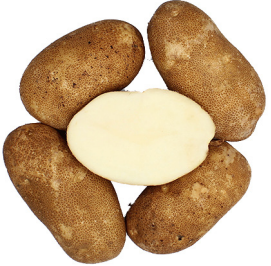
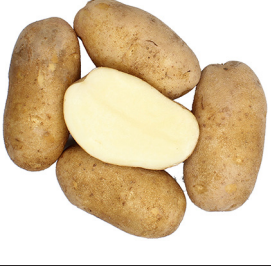
11 inch In-Row Spacing

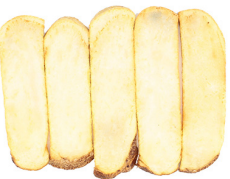
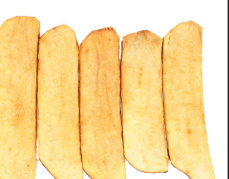
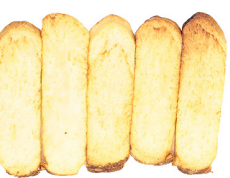
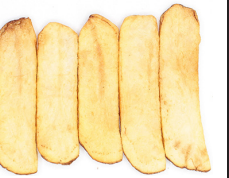
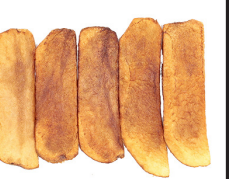
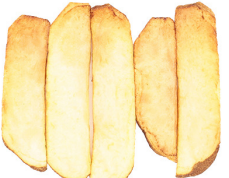




Tubers	WA Late Harvest Regional Trial Comments
Clearwater Russet	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform; Blanched = light, non-uniform.
Ranger Russet	
	Tubers: Oblong to long tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = light, non-uniform; Blanched = relatively dark, uniform.
Russet Burbank	
	Tubers: Oblong to long tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = relatively dark, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, uniform.
AOR08540-1	
	Tubers: Oblong to long tubers. Fair skin set; shallow eyes. Fry color: At harvest= light, non-uniform; 48°F = relatively dark, non-uniform; 44°F = unnacceptably dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = unnacceptably dark, uniform.
CO10085-1RU	
	Tubers: Round to oblong tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Blanching	40° F Recon.
Clearwater Russet					
					
Ranger Russet					
					
Russet Burbank					
					
AOR08540-1					
					
CO10085-1RU					
					

Tubers	WA Late Harvest Regional Trial Comments
CO11009-3RU	
	Tubers: Oblong tubers. Good skin set; moderate eye depth. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, uniform; 40°F = light, non-uniform; Reconditioned = light, uniform; Blanched = light, uniform.
CO12378-1RU	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, uniform; 40°F = light, uniform; Reconditioned = light, uniform; Blanched = light, uniform.
OR12133-10	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = unacceptably dark, uniform.
POR12NCK50-1	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light, uniform; 48°F = light, uniform; 44°F = light, non-uniform; 40°F = unnacceptably dark, uniform; Reconditioned = relatively dark, non-uniform; Blanched = relatively dark, uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Blanching	40° F Recon.
CO11009-3RU					
					
CO12378-1RU					
					
OR12133-10					
					
POR12NCK50-1					
					

2021 Late Harvest Regional Trial

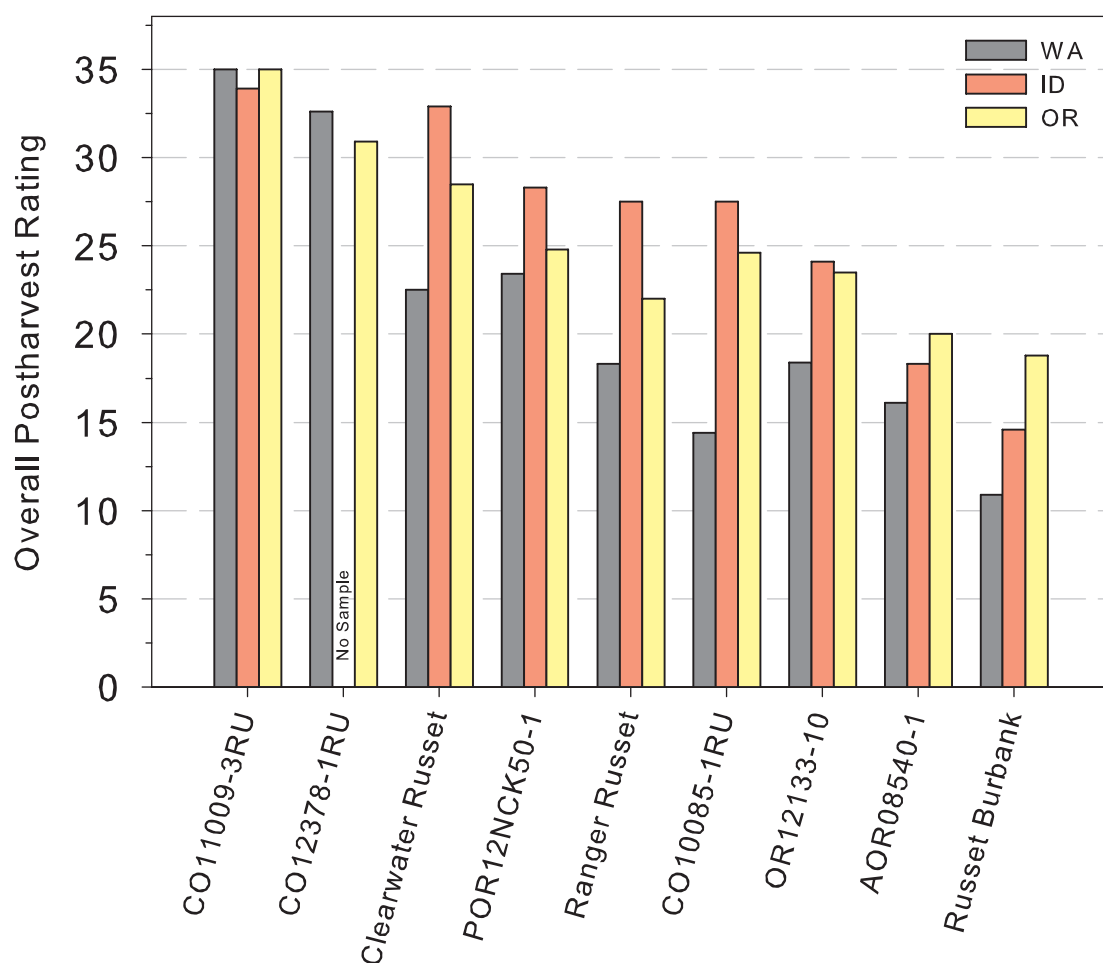
Accumulated Total Postharvest Ratings of Clones

Clone	WA		ID		OR		3 State av. Rating Total
	Rating Total §	Discard §§	Rating Total §	Discard §§	Rating Total §	Discard §§	
6 CO11009-3RU	35.0		33.9		35.0		34.6
7 CO12378-1RU	32.6		No Sample		30.9		31.8
1 Clearwater Russet	22.5		32.9		28.5		28.0
9 POR12NCK50-1	23.4	40°F	28.3		24.8	40°F	25.5
2 Ranger Russet	18.3	40°F	27.5		22.0	40°F	22.6
5 CO10085-1RU	14.4	40°F	27.5		24.6		22.2
8 OR12133-10	18.4	40°F	24.1		23.5		22.0
4 AOR08540-1	16.1	44°F, 40°F	18.3	40°F	20	40°F	18.1
3 Russet Burbank	10.9	Sp Gr, 40°F	14.6	Sp Gr, 40°F	18.8	40°F	14.8
	21.3		25.9		25.3		24.4

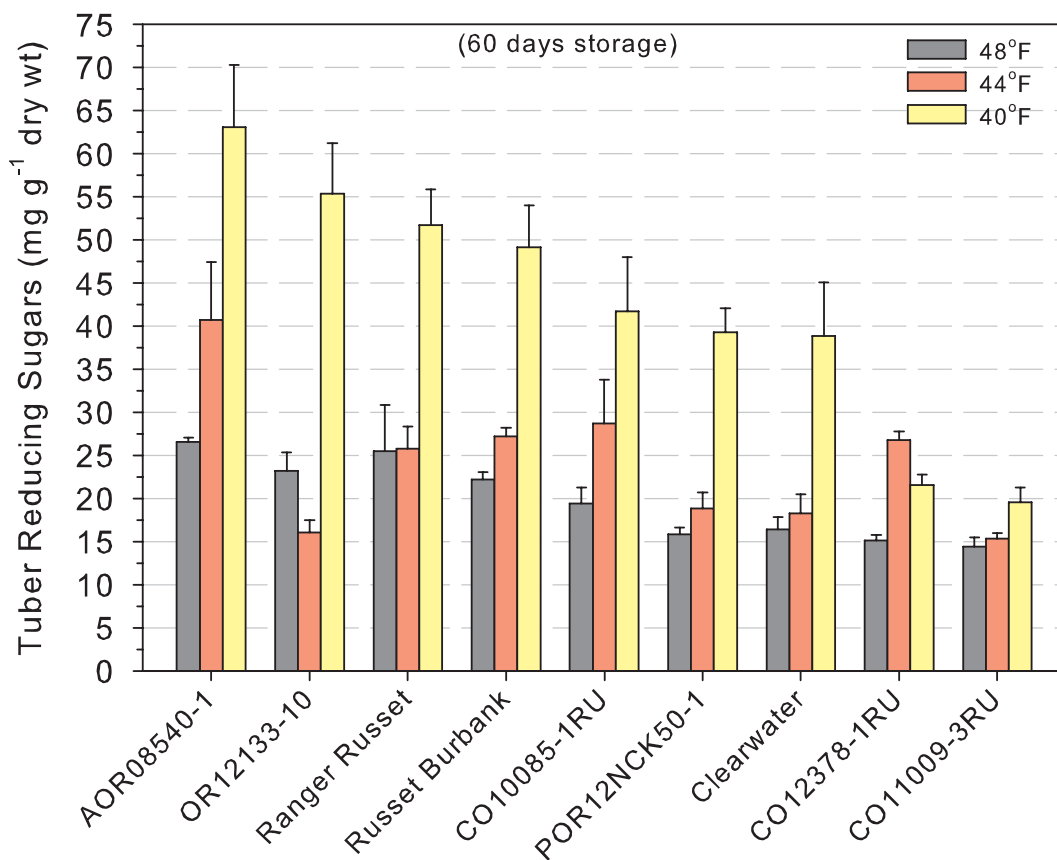
§ maximum rating possible = 38

§§ Values for the indicated evaluation are lower than the rejection level.

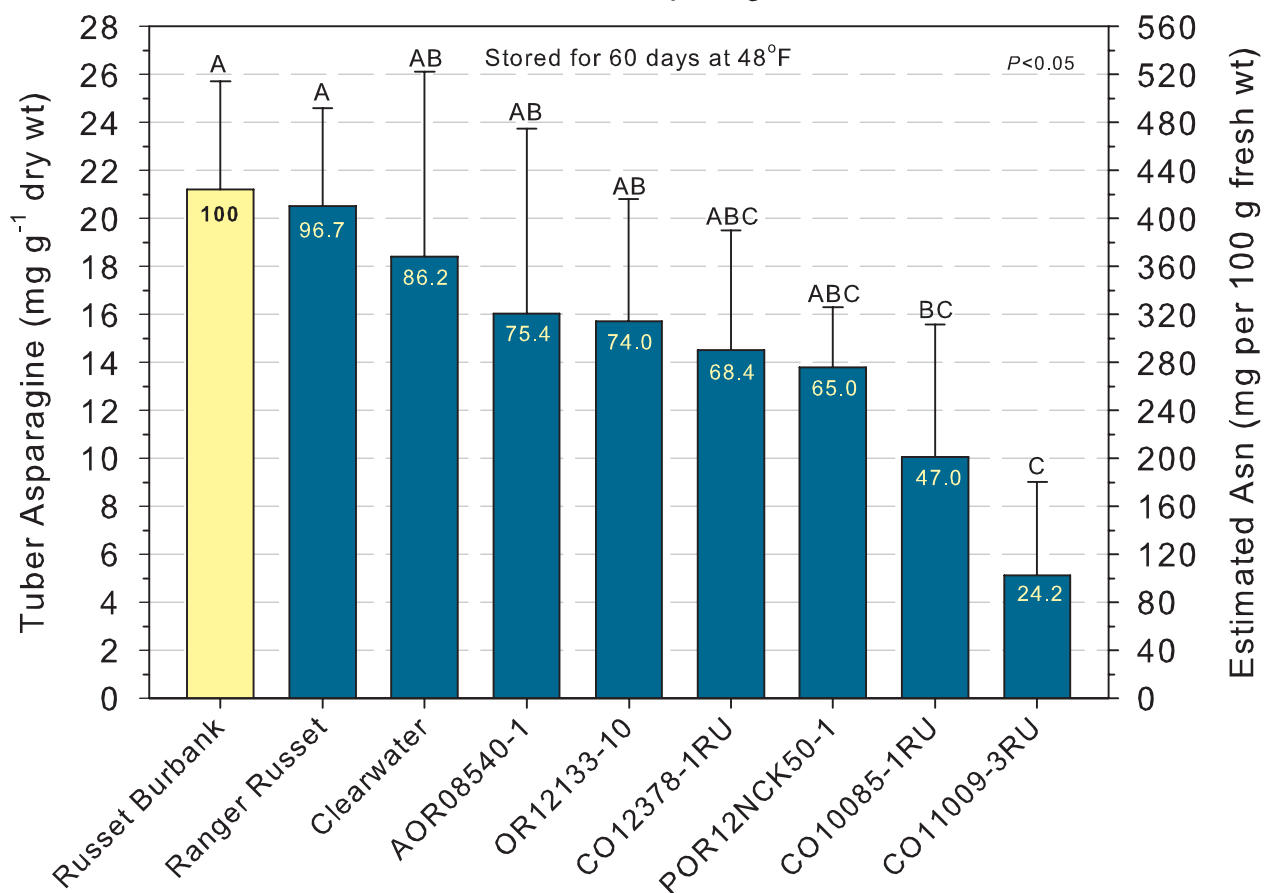
2021 Late Harvest Regional Trial Postharvest Ratings



2021 WA LRT Reducing Sugars



2021 WA LRT Tuber Asparagine Content



2021 Late Harvest Regional Trial

Prior to Storage

PHOTOVOLT READING						USDA	SPECIFIC		
Clone	stem	bud	av	rtg §	DIFF	COLOR	GRAVITY	rtg	Range
Washington									
1 Clearwater Russet	31.8	42.3	37.1	4-	10.6	0	1.085	5	1.080-1.090
2 Ranger Russet	26.6	36.4	31.5	3-	9.8	1	1.086	5	1.080-1.095
3 Russet Burbank	21.4	37.7	29.5	2-	16.3	1	1.074	0	1.065-1.075
4 AOR08540-1	27.5	38.3	32.9	3-	12.5	1	1.084	5	1.080-1.090
5 CO10085-1RU	30.2	42.8	36.5	4-	12.6	1	1.080	3	1.075-1.085
6 CO11009-3RU	45.7	43.5	44.6	5+	3.0	0	1.083	5	1.080-1.090
7 CO12378-1RU	42.8	47.9	45.4	5+	6.9	0	1.084	5	1.085-1.095
8 OR12133-10	28.5	35.1	31.8	3+	6.8	1	1.081	4	1.075-1.085
9 POR12NCK50-1	36.9	43.9	40.4	4+	8.4	0	1.083	5	1.080-1.095
Average		LSD 0.05	3.0		5.0		0.007		
	32.4	40.9	36.6		9.6	1	1.082		
Idaho									
1 Clearwater Russet	40.1	40.6	40.3	4+	4.2	0	1.086	5	1.085-1.095
2 Ranger Russet	37.8	35.7	36.8	4+	4.2	0	1.092	3	1.085-1.095
3 Russet Burbank	24.1	25.7	24.9	2+	3.8	2	1.072	0	1.065-1.075
4 AOR08540-1	21.9	24.4	23.1	1+	5.3	2	1.086	5	1.080-1.090
5 CO10085-1RU	27.4	29.9	28.6	2+	5.9	1	1.088	5	1.085-1.095
6 CO11009-3RU	46.7	42.9	44.8	5+	4.0	0	1.092	3	1.085-1.095
7 CO12378-1RU	No Sample						No Sample		
8 OR12133-10	41.3	35.4	38.3	4+	6.5	0	1.091	4	1.085-1.095
9 POR12NCK50-1	41.9	40.2	41.1	5+	5.3	0	1.079	2	1.075-1.085
Average		LSD 0.05	4.4		ns		0.004		
	35.1	34.3	34.7		4.9	1	1.086		
Oregon									
1 Clearwater Russet	44.3	44.0	44.2	5+	3.9	0	1.076	1	1.075-1.085
2 Ranger Russet	36.8	40.0	38.4	4+	4.4	0	1.079	2	1.075-1.085
3 Russet Burbank	29.9	37.3	33.6	3+	7.4	1	1.072	0	1.065-1.075
4 AOR08540-1	30.9	37.2	34.1	3+	8.2	0	1.079	2	1.075-1.085
5 CO10085-1RU	40.2	47.5	43.9	5+	7.2	0	1.077	1	1.075-1.085
6 CO11009-3RU	50.8	46.3	48.5	5+	4.9	0	1.083	5	1.080-1.090
7 CO12378-1RU	51.2	51.5	51.3	5+	1.9	0	1.079	2	1.075-1.085
8 OR12133-10	35.4	39.4	37.4	4+	6.0	0	1.076	1	1.075-1.085
9 POR12NCK50-1	42.4	43.0	42.7	5+	2.3	0	1.077	1	1.070-1.080
Average		LSD 0.05	2.7		3.2		0.005		
	40.2	42.9	41.6		5.1	0	1.078		

Date test performed:

Washington

Sept. 28

Sept. 27

Idaho

Oct. 6

Sept. 30

Oregon

Sept. 30

Sept. 28

§ rtg = rating (1-5, 5 is best); av = average Photovolt reading; Diff = Absolute difference between stem and bud Photovolt reading. Stem to bud differences of nine or greater (-) lose one point and differences of less than nine (+) gain one point in the accumulated total postharvest rating.

Specific Gravity done by weight in air weight in water method. Range done by brine solutions.

2021 Late Harvest Regional Trial

Stored at 48°F after Arrival

Clone	FRENCH FRY	BRUISE POTENTIAL				SOFT ROT INDEX	
	TASTE PANEL	(percent)		[color 5=darkest]		(percent)	
	rating	stem	bud	stem	bud	stem	bud
Washington							
1 Clearwater Russet	3.5	13	33	1.3	1.7	8	13
2 Ranger Russet	3.3	83	25	4.0	1.5	10	11
3 Russet Burbank	2.9	67	8	2.8	1.2	8	16
4 AOR08540-1	3.1	25	0	1.5	1.0	13	14
5 CO10085-1RU	3.4	4	4	1.1	1.1	12	13
6 CO11009-3RU	4.0	58	0	2.5	1.0	7	11
7 CO12378-1RU	3.6	4	0	1.1	1.0	8	6
8 OR12133-10	2.4	92	17	3.9	1.4	18	19
9 POR12NCK50-1	3.4	71	8	3.0	1.2	8	9
<i>LSD 0.05</i>	<i>0.5</i>	23	19			4	5
Average	3.3	46.3	10.6	2.3	1.2	10.2	12.5
Idaho							
1 Clearwater Russet	3.9	13	4	1.3	1.1	9	11
2 Ranger Russet	3.5	92	0	3.8	1.0	10	9
3 Russet Burbank	2.6	13	0	1.3	1.0	9	10
4 AOR08540-1	2.3	8	0	1.2	1.0	13	12
5 CO10085-1RU	3.5	8	0	1.2	1.0	9	10
6 CO11009-3RU	3.9	17	0	1.4	1.0	10	14
7 CO12378-1RU	No Sample	No Sample		No Sample		No Sample	
8 OR12133-10	3.0	75	4	3.1	1.1	8	9
9 POR12NCK50-1	3.3	0	0	1.0	1.0	8	12
<i>LSD 0.05</i>	<i>0.4</i>	21	<i>ns</i>			4	4
Average	3.3	28.1	1.0	1.8	1.0	9.6	10.9
Oregon							
1 Clearwater Russet	3.5	8	8	1.2	1.2	12	14
2 Ranger Russet	3.0	79	0	3.3	1.0	10	11
3 Russet Burbank	2.8	96	0	4.0	1.0	10	15
4 AOR08540-1	3.0	4	4	1.1	1.1	12	14
5 CO10085-1RU	3.6	0	0	1.0	1.0	11	9
6 CO11009-3RU	4.0	17	13	1.3	1.3	8	9
7 CO12378-1RU	3.9	0	4	1.0	1.1	No Sample	
8 OR12133-10	3.5	92	13	3.2	1.3	11	13
9 POR12NCK50-1	3.8	46	0	2.1	1.0	9	8
<i>LSD 0.05</i>	<i>0.6</i>	20	<i>ns</i>			4	5
Average	3.4	38.0	4.6	2.0	1.1	10.3	11.5

Date test performed:

Washington

Oct. 15

Oct. 26

Nov. 2

Idaho

Oct. 20

Oct. 28

Nov. 17

Oregon

Oct. 18

Oct. 26

Nov. 5

2021 Late Harvest Regional Trial

Stored at 48°F for 60 Days

Clone	PHOTOVOLT READING				DIFF	USDA COLOR	% REDUCING SUGAR		SPROUTING	
	stem	bud	average	rtg §			stem	bud	(%)	length (in)
Washington										
1 Clearwater Russet	33.6	46.6	40.1	4-	13.0	0	1.1	0.5	79	0.13
2 Ranger Russet	24.9	38.6	31.8	3-	13.6	1	2.0	0.8	54	0.50
3 Russet Burbank	20.3	34.8	27.5	2-	14.5	2	2.6	1.0	0	
4 AOR08540-1	22.8	32.1	27.4	2-	9.4	2	2.3	1.2	27	0.13
5 CO10085-1RU	25.8	38.7	32.2	3-	12.9	1	1.9	0.8	93	1.50
6 CO11009-3RU	48.5	46.7	47.6	5+	2.2	0	0.5	0.5	8	0.25
7 CO12378-1RU	48.3	45.9	47.1	5+	4.8	0	0.5	0.5	7	0.13
8 OR12133-10	25.1	37.4	31.2	3-	12.3	1	1.9	0.9	100	1.50
9 POR12NCK50-1	35.7	42.2	39.0	4+	8.1	0	1.0	0.6	0	
Average	LSD 0.05		2.8		4.2				20	
	31.7	40.3	36.0		10.1	1	1.5	0.8	41	
Idaho										
1 Clearwater Russet	48.4	48.7	48.6	5+	2.2	0	0.5	0.5	47	0.13
2 Ranger Russet	38.1	39.8	38.9	4+	3.1	0	0.8	0.7	14	0.13
3 Russet Burbank	25.8	29.9	27.9	2+	6.5	1	1.8	1.4	0	
4 AOR08540-1	21.8	26.3	24.0	1+	5.0	2	2.4	1.8	0	
5 CO10085-1RU	36.7	35.8	36.2	4+	4.8	0	0.9	0.9	100	1.00
6 CO11009-3RU	48.9	45.2	47.0	5+	4.3	0	0.5	0.6	0	
7 CO12378-1RU	No Sample						No Sample		No Sample	
8 OR12133-10	41.8	40.6	41.2	5+	3.8	0	0.7	0.7	100	1.00
9 POR12NCK50-1	44.7	43.3	44.0	5+	4.0	0	0.6	0.6	0	
Average	LSD 0.05		4.2		2.7				16	
	38.3	38.7	38.5		4.2	0	1.0	0.9	33	
Oregon										
1 Clearwater Russet	48.5	48.6	48.5	5+	3.1	0	0.5	0.5	85	0.50
2 Ranger Russet	34.4	37.5	35.9	4+	5.4	0	1.0	0.9	100	1.25
3 Russet Burbank	28.5	33.7	31.1	3+	5.6	1	1.5	1.1	0	
4 AOR08540-1	27.3	34.2	30.7	3+	7.0	1	1.7	1.1	93	0.50
5 CO10085-1RU	40.0	45.2	42.6	5+	6.2	0	0.7	0.6	100	3.50
6 CO11009-3RU	52.2	49.4	50.8	5+	3.1	0	0.5	0.5	100	0.75
7 CO12378-1RU	47.9	46.4	47.1	5+	3.5	0	0.5	0.5	87	1.00
8 OR12133-10	36.1	40.7	38.4	4+	4.7	0	0.9	0.7	100	4.25
9 POR12NCK50-1	40.0	41.2	40.6	5+	2.4	0	0.7	0.7	20	0.13
Average	LSD 0.05		2.7		2.7				16	
	39.4	41.9	40.7		4.6	0	0.9	0.7	76	

Date test performed:

Washington

Nov. 29

Nov. 29

Dec. 16

Idaho

Dec. 10

Dec. 10

Dec. 16

Oregon

Dec. 4

Dec. 4

Dec. 16

§ rtg = rating (1-5, 5 is best); av = average Photovolt reading; Diff = Absolute difference between stem and bud Photovolt reading. Stem to bud differences of nine or greater (-) lose one point and differences of less than nine (+) gain one point in the accumulated total postharvest rating.

2021 Late Harvest Regional Trial

Stored at 44°F for 60 Days

Clone		PHOTOVOLT READING				DIFF	USDA COLOR	% REDUCING SUGAR	
		stem	bud	average	rtg §			stem	bud
Washington									
1 Clearwater Russet	28.2	41.7	34.9	3-	13.8	1	1.6	0.7	
2 Ranger Russet	22.7	35.8	29.2	2-	13.0	2	2.3	0.9	
3 Russet Burbank	18.2	34.2	26.2	2-	16.0	3	3.0	1.1	
4 AOR08540-1	14.0	24.0	19.0	0	10.1	4	3.9	2.1	
5 CO10085-1RU	20.0	36.5	28.2	2-	16.5	2	2.7	0.9	
6 CO11009-3RU	47.7	48.0	47.8	5+	1.7	0	0.5	0.5	
7 CO12378-1RU	42.9	46.6	44.8	5+	4.1	0	0.6	0.5	
8 OR12133-10	18.1	31.7	24.9	2-	13.6	3	3.0	1.2	
9 POR12NCK50-1	29.2	40.1	34.7	3-	10.8	1	1.5	0.7	
Average	LSD 0.05		2.9		4.4				
	26.8	37.6	32.2		11.1	2	2.1	1.0	
Idaho									
1 Clearwater Russet	41.1	43.3	42.2	5+	5.2	0	0.7	0.6	
2 Ranger Russet	35.0	36.3	35.6	4+	4.6	0	1.0	0.9	
3 Russet Burbank	23.7	24.0	23.9	1+	2.5	2	2.1	2.1	
4 AOR08540-1	20.9	25.0	23.0	1+	4.1	2	2.5	1.9	
5 CO10085-1RU	35.7	42.7	39.2	4+	8.5	0	1.0	0.6	
6 CO11009-3RU	44.0	41.2	42.6	5+	3.1	0	0.6	0.7	
7 CO12378-1RU	No Sample						No Sample		
8 OR12133-10	38.7	40.3	39.5	4+	5.6	0	0.8	0.7	
9 POR12NCK50-1	39.9	40.8	40.3	4+	4.6	0	0.7	0.7	
Average	LSD 0.05		4.2		3.0				
	34.9	36.7	35.8		4.8	1	1.2	1.0	
Oregon									
1 Clearwater Russet	43.5	46.4	44.9	5+	5.4	0	0.6	0.5	
2 Ranger Russet	26.8	33.1	30.0	2+	7.3	1	1.7	1.1	
3 Russet Burbank	21.3	28.7	25.0	2+	7.6	2	2.5	1.5	
4 AOR08540-1	18.7	25.0	21.9	1+	6.3	3	2.9	2.0	
5 CO10085-1RU	29.5	38.4	33.9	3-	10.5	1	1.4	0.8	
6 CO11009-3RU	48.4	46.2	47.3	5+	3.8	0	0.5	0.5	
7 CO12378-1RU	47.5	47.9	47.7	5+	3.2	0	0.5	0.5	
8 OR12133-10	28.6	33.9	31.2	3+	5.8	1	1.5	1.1	
9 POR12NCK50-1	33.3	39.1	36.2	4+	5.9	0	1.1	0.8	
Average	LSD 0.05		3.2		4.2				
	33.0	37.6	35.3		6.2	1	1.4	1.0	

Date test performed:

Washington

Nov. 29

Nov. 29

Idaho

Dec. 10

Dec. 10

Oregon

Dec. 4

Dec. 4

§ rtg = rating (1-5, 5 is best); av = average Photovolt reading; Diff = Absolute difference between stem and bud Photovolt reading. Stem to bud differences of nine or greater (-) lose one point and differences of less than nine (+) gain one point in the accumulated total postharvest rating.

2021 Late Harvest Regional Trial

Stored at 40°F for 60 Days and Reconditioned

Clone	PHOTOVOLT(60 Days at 40°F)							PHOTOVOLT AFTER RECONDITIONING (21 days at 60°F)				
	SPROUTING (%)	stem	bud	average	rtg \$	DIFF	USDA COLOR	stem	bud	average	DIFF	USDA COLOR
Washington												
1 Clearwater Russet	0	18.8	33.5	26.1	2	14.7	3	24.8	44.4	34.6	19.6	1
2 Ranger Russet	0	12.8	20.5	16.7	0	7.7	4	24.0	39.3	31.7	15.3	2
3 Russet Burbank	0	11.7	21.8	16.7	0	10.0	4	16.5	35.9	26.2	19.4	3
4 AOR08540-1	0	9.5	12.8	11.2	0	3.4	4	14.8	25.1	20.0	10.3	3
5 CO10085-1RU	0	12.9	18.1	15.5	0	5.5	0	21.5	37.6	29.5	16.1	2
6 CO11009-3RU	0	31.2	40.1	35.6	4	9.0	0	39.0	46.1	42.5	8.3	0
7 CO12378-1RU	0	31.6	36.0	33.8	3	6.0	0	44.0	49.9	46.9	5.9	0
8 OR12133-10	0	9.9	14.7	12.3	0	4.9	4	17.7	37.9	27.8	20.3	3
9 POR12NCK50-1	0	11.6	17.9	14.8	0	6.3	4	20.3	38.0	29.1	17.7	2
<i>LSD 0.05</i>	<i>ns</i>			2.4		3.6				2.9	5.0	
Average	0	16.7	23.9	20.3		7.5	3	24.7	39.4	32.0	14.8	2
Idaho												
1 Clearwater Russet	0	31.5	39.5	35.5	4	8.0	0	36.5	43.2	39.9	6.9	0
2 Ranger Russet	0	23.5	23.2	23.3	1	3.9	2	36.9	40.3	38.6	5.7	0
3 Russet Burbank	0	14.6	16.0	15.3	0	3.5	3	22.6	27.2	24.9	4.6	2
4 AOR08540-1	0	11.5	13.5	12.5	0	2.4	4	14.3	19.6	16.9	5.4	4
5 CO10085-1RU	13	23.7	27.6	25.6	2	4.2	2	36.5	41.4	38.9	5.4	0
6 CO11009-3RU	0	34.8	36.2	35.5	4	4.1	0	35.7	41.1	38.4	6.3	0
7 CO12378-1RU		No Sample						No Sample				
8 OR12133-10	0	29.4	30.0	29.7	2	3.4	1	39.3	43.3	41.3	7.6	0
9 POR12NCK50-1	0	19.5	20.9	20.2	1	3.3	2	28.8	33.9	31.3	6.6	1
<i>LSD 0.05</i>	9			3.9		2.3				5.1	<i>ns</i>	
Average	2	23.6	25.8	24.7		4.1	2	31.3	36.2	33.8	6.1	1
Oregon												
1 Clearwater Russet	33	26.4	37.9	32.2	3	11.5	1	29.4	42.3	35.9	12.9	1
2 Ranger Russet	8	15.0	20.5	17.8	0	6.1	3	18.5	37.9	28.2	19.4	3
3 Russet Burbank	0	11.7	16.1	13.9	0	4.4	4	17.7	27.7	22.7	10.1	3
4 AOR08540-1	0	12.0	17.6	14.8	0	5.6	4	16.6	24.6	20.6	9.1	3
5 CO10085-1RU	69	20.4	28.7	24.5	2	8.5	2	19.1	35.8	27.5	16.7	3
6 CO11009-3RU	0	41.4	42.3	41.9	5	4.2	0	46.9	48.6	47.7	3.2	0
7 CO12378-1RU	0	39.9	41.5	40.7	5	3.5	0	45.6	48.9	47.2	4.3	0
8 OR12133-10	53	18.1	24.8	21.4	1	6.7	3	22.4	34.9	28.7	12.9	2
9 POR12NCK50-1	0	17.4	19.0	18.2	0	2.0	3	21.1	25.1	23.1	4.1	2
<i>LSD 0.05</i>	19			3.4		3.6				3.2	4.8	
Average	18	22.5	27.6	25.0		5.8	2	26.4	36.2	31.3	10.3	2

Date test performed:

Washington

Dec. 16

Nov. 30

Dec. 14

Idaho

Dec. 16

Dec. 9

Dec. 15

Oregon

Dec. 16

Dec. 5

Dec. 14

DIFF = Absolute difference between bud and stem Photovolt reading.

Sprouting was rated after approximately 3 months after storage.

2021 Late Harvest Regional Trial

Stored at 40°F for 60 Days and Water Blanched

Clone	PHOTOVOLT(60 Days at 40°F)						PHOTOVOLT AFTER WATER BLANCHING				
	stem	bud	average	rtg §	DIFF	USDA COLOR	stem	10 min @ 160°F bud	average	DIFF	USDA COLOR
Washington											
1 Clearwater Russet	18.8	33.5	26.1	2	14.7	3	24.6	39.9	32.2	15.2	1
2 Ranger Russet	12.8	20.5	16.7	0	7.7	4	19.8	26.3	23.1	7.5	2
3 Russet Burbank	11.7	21.8	16.7	0	10.0	4	16.6	22.5	19.6	7.0	3
4 AOR08540-1	9.5	12.8	11.2	0	3.4	4	15.5	19.3	17.4	4.0	3
5 CO10085-1RU	12.9	18.1	15.5	0	5.5	0	17.8	24.5	21.1	6.9	3
6 CO11009-3RU	31.2	40.1	35.6	4	9.0	0	34.1	37.3	35.7	3.4	0
7 CO12378-1RU	31.6	36.0	33.8	3	6.0	0	37.3	44.0	40.6	7.3	0
8 OR12133-10	9.9	14.7	12.3	0	4.9	4	16.4	19.3	17.9	3.6	3
9 POR12NCK50-1	11.6	17.9	14.8	0	6.3	4	20.0	23.5	21.8	3.9	2
LSD 0.05			2.4		3.6				2.7	3.7	
Average	16.7	23.9	20.3		7.5	2.6	22.5	28.5	25.5	6.5	2
Idaho											
1 Clearwater Russet	31.5	39.5	35.5	4	8.0	0	41.1	40.9	41.0	3.3	0
2 Ranger Russet	23.5	23.2	23.3	1	3.9	2	28.9	28.5	28.7	4.7	1
3 Russet Burbank	14.6	16.0	15.3	0	3.5	3	21.7	20.1	20.9	4.6	2
4 AOR08540-1	11.5	13.5	12.5	0	2.4	4	16.4	16.9	16.6	3.1	3
5 CO10085-1RU	23.7	27.6	25.6	2	4.2	2	29.9	29.8	29.9	4.7	1
6 CO11009-3RU	34.8	36.2	35.5	4	4.1	0	38.4	37.7	38.1	2.8	0
7 CO12378-1RU			No Sample						No Sample		
8 OR12133-10	29.4	30.0	29.7	2	3.4	1	35.3	35.6	35.5	2.8	0
9 POR12NCK50-1	19.5	20.9	20.2	1	3.3	2	27.4	26.0	26.7	4.0	1
LSD 0.05			3.9		2.3				3.5	ns	
Average	23.6	25.8	24.7		4.1	2	29.9	29.4	29.7	3.737917	1
Oregon											
1 Clearwater Russet	26.4	37.9	32.2	3	11.5	1	35.5	43.2	39.4	8.1	0
2 Ranger Russet	15.0	20.5	17.8	0	6.1	3	22.5	28.2	25.4	6.1	2
3 Russet Burbank	11.7	16.1	13.9	0	4.4	4	18.2	23.9	21.1	5.8	3
4 AOR08540-1	12.0	17.6	14.8	0	5.6	4	21.5	23.0	22.2	3.6	2
5 CO10085-1RU	20.4	28.7	24.5	2	8.5	2	30.0	35.3	32.7	6.1	1
6 CO11009-3RU	41.4	42.3	41.9	5	4.2	0	49.2	46.7	48.0	2.8	0
7 CO12378-1RU	39.9	41.5	40.7	5	3.5	0	44.2	44.6	44.4	3.1	0
8 OR12133-10	18.1	24.8	21.4	1	6.7	3	29.3	31.0	30.2	4.8	1
9 POR12NCK50-1	17.4	19.0	18.2	0	2.0	3	30.3	30.6	30.5	1.9	1
LSD 0.05			3.4		3.6				3.0	3.3	
Average	22.5	27.6	25.0		5.8	2	31.2	34.1	32.6	4.7	1

Date test performed:

Washington

Nov. 30

Nov. 30

Idaho

Dec. 9

Dec. 9

Oregon

Dec. 5

Dec. 5

Diff = Absolute difference between stem and bud Photovolt reading.

Entries Retained from the 2020 Trials Currently in the Regional Trial

Harvested fall of 2020

Held at 48°F until December 17

Stored at 44°F until analysis

One clone, COA11013-2, was advanced from the 2020 Tri-State Trial into the 2021 Regional Trial. As was the case in the past two years, COA11013-2 showed ACD almost immediately after frying. Five clones were retained in the Regional Trial. When averaged across states, CO11009-3RU produced the lightest fries (46.9 ref units). The uniformity of fry color was unacceptable for RB and CO10085-1RU from all three states. Clearwater had 14.8 photovolt units difference when grown in WA. Sprouts ranged from 1.5 to 12 inches. COA11013-2 and CO10085-1RU produced the longest 3 state average sprouts of 12.0 and 11.67 respectively.

		PHOTOVOLT READING				USDA	% REDUCING SUGAR			Sprouting	
Clone		stem	bud	avg	DIFF	COLOR	stem	bud	avg	percent	length (in.)
Washington											
1 Clearwater		27.9	42.2	35.0	14.8	1	1.6	0.6	1.1	100	2.0
2 Ranger Russet		24.5	31.0	27.7	6.4	1	2.0	1.3	1.7	100	4.0
3 Russet Burbank		17.6	32.8	25.2	15.4	3	3.1	1.1	2.1	100	3.0
4 AOR08540-1		31.2	35.3	33.2	4.8	0	1.3	1.0	1.1	100	3.5
5 CO10085-1RU		24.5	40.3	32.4	16.5	1	2.0	0.7	1.4	100	11.0
6 CO11009-3RU		43.8	47.6	45.7	4.7	0	0.6	0.5	0.6	100	8.0
7 COA11013-2 §		31.4	39.7	35.5	8.7	0	1.3	0.7	1.0	100	10.0
8 OR12133-10		25.4	36.2	30.8	10.8	1	1.9	0.9	1.4	100	11.0
9 POR12NCK50-1		32.6	44.8	38.7	12.4	0	1.2	0.6	0.9	100	9.0
Average		LSD 0.05		3.7	5.2						
		28.8	38.9	33.8	10.5	1	1.8	0.9	1.4	100	
Idaho											
1 Clearwater		43.5	51.0	47.3	8.9	0	0.6	0.5	0.6	100	1.0
2 Ranger Russet		32.3	39.8	36.1	7.5	0	1.2	0.7	1.0	100	3.5
3 Russet Burbank		28.8	45.2	37.0	16.4	1	1.5	0.6	1.0	100	2.0
4 AOR08540-1		28.8	37.6	33.2	9.2	1	1.5	0.8	1.2	100	2.0
5 CO10085-1RU		33.2	46.3	39.8	13.1	0	1.1	0.5	0.8	100	12.0
6 CO11009-3RU		43.9	49.7	46.8	6.7	0	0.6	0.5	0.6	100	5.0
7 COA11013-2 §		40.3	47.4	43.8	7.2	0	0.7	0.5	0.6	100	13.0
8 OR12133-10		35.1	41.8	38.4	6.7	0	1.0	0.7	0.8	100	8.0
9 POR12NCK50-1		44.4	48.3	46.3	4.7	0	0.6	0.5	0.6	100	5.0
Average		LSD 0.05		3.3	4.9						
		36.7	45.2	41.0	8.9	0	1.0	0.6	0.8	100	
Oregon											
1 Clearwater		46.0	46.4	46.2	3.5	0	0.5	0.5	0.5	100	1.5
2 Ranger Russet		29.7	31.6	30.6	5.4	1	1.4	1.2	1.3	100	3.5
3 Russet Burbank		31.2	35.7	33.4	4.6	0	1.3	1.0	1.1	100	4.0
4 AOR08540-1		31.5	33.7	32.6	3.8	0	1.3	1.1	1.2	100	2.0
5 CO10085-1RU		37.8	46.3	42.0	9.1	0	0.8	0.5	0.7	100	12.0
6 CO11009-3RU		48.5	48.3	48.4	3.9	0	0.5	0.5	0.5	100	10.0
7 COA11013-2 §		39.9	38.7	39.3	3.7	0	0.7	0.8	0.8	100	13.0
8 OR12133-10		32.1	39.9	36.0	7.8	0	1.2	0.7	1.0	100	9.0
9 POR12NCK50-1		34.0	40.2	37.1	7.2	0	1.1	0.7	0.9	100	5.0
Average		LSD 0.05		4.1	3.4						
		36.7	40.1	38.4	5.4	0	1.0	0.8	0.9	100	

Date test performed:

Washington April 26**Idaho** April 27**Oregon** April 28

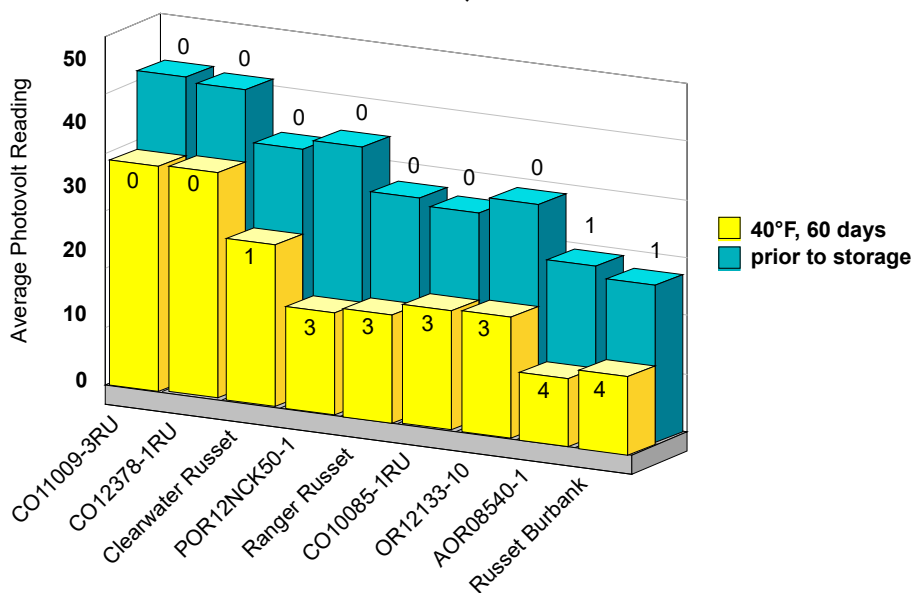
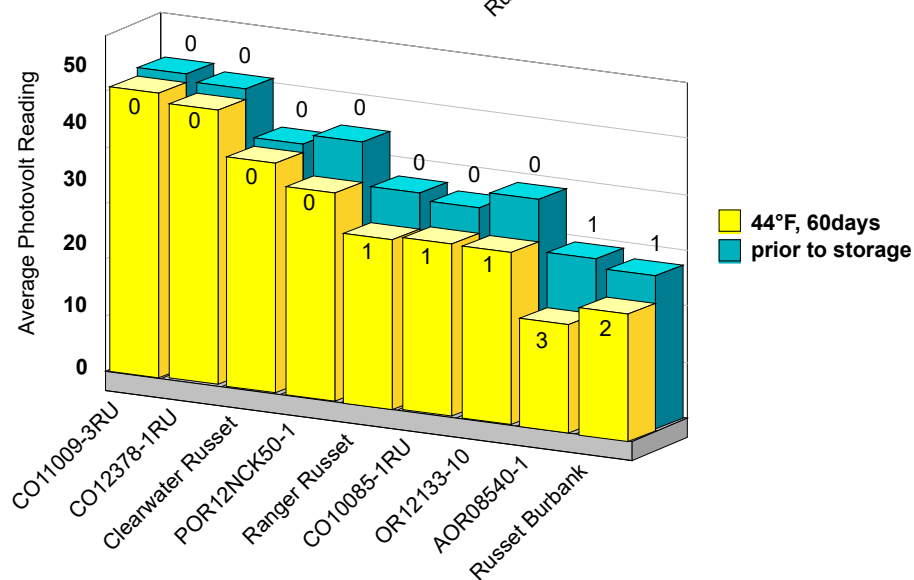
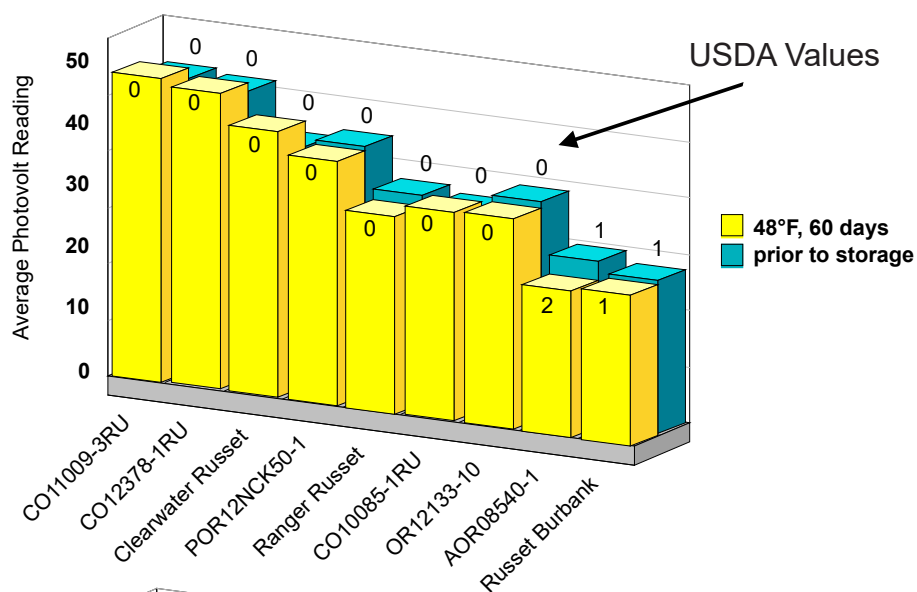
§ Advanced from 2020 Tri-State Trial.

It takes a village...



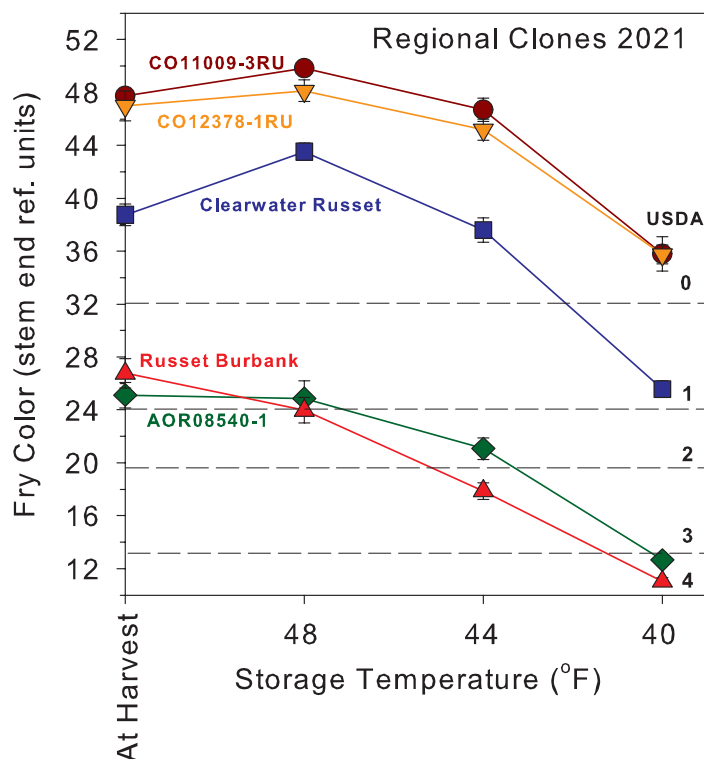
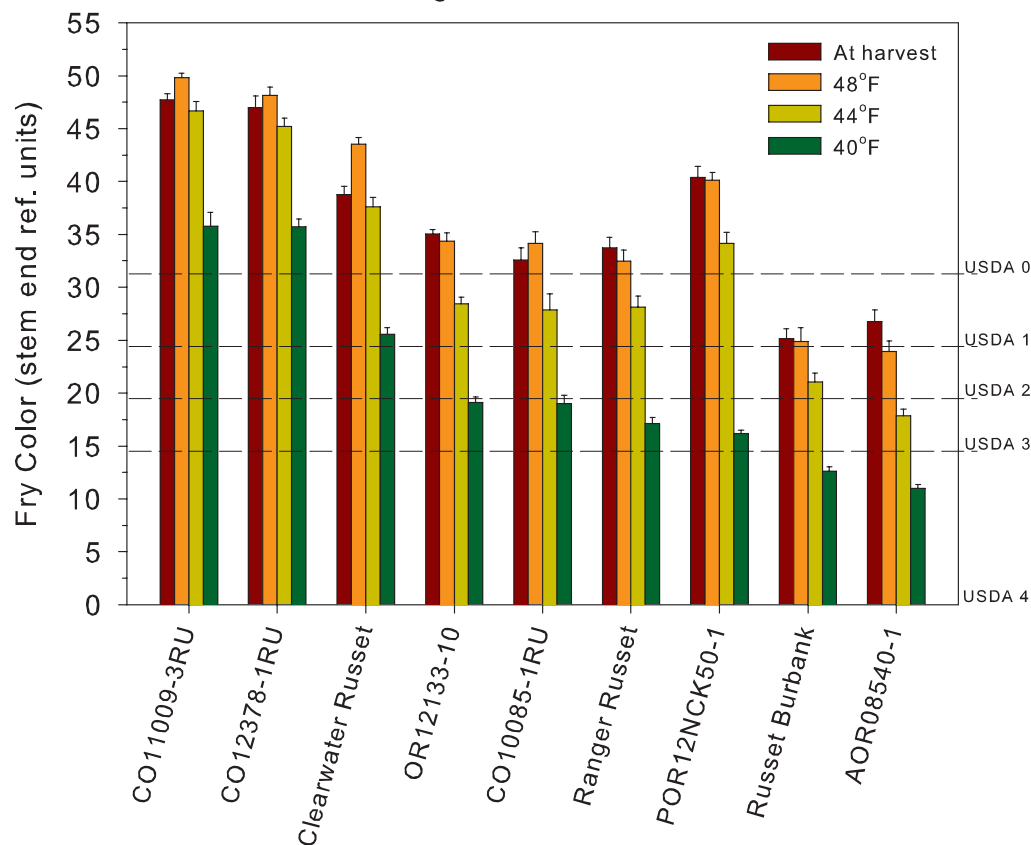
Regional Trial - 3 State Average of Stem End

2021 Late Harvest Regional Trial



2021 Late Harvest Regional Trial

Regional Clones 2021

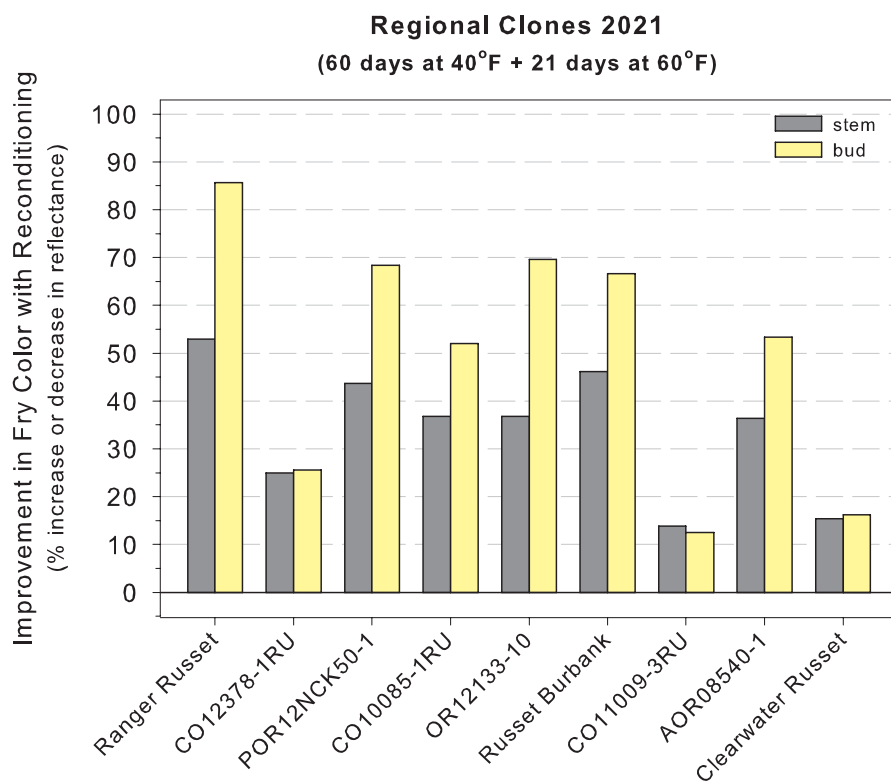
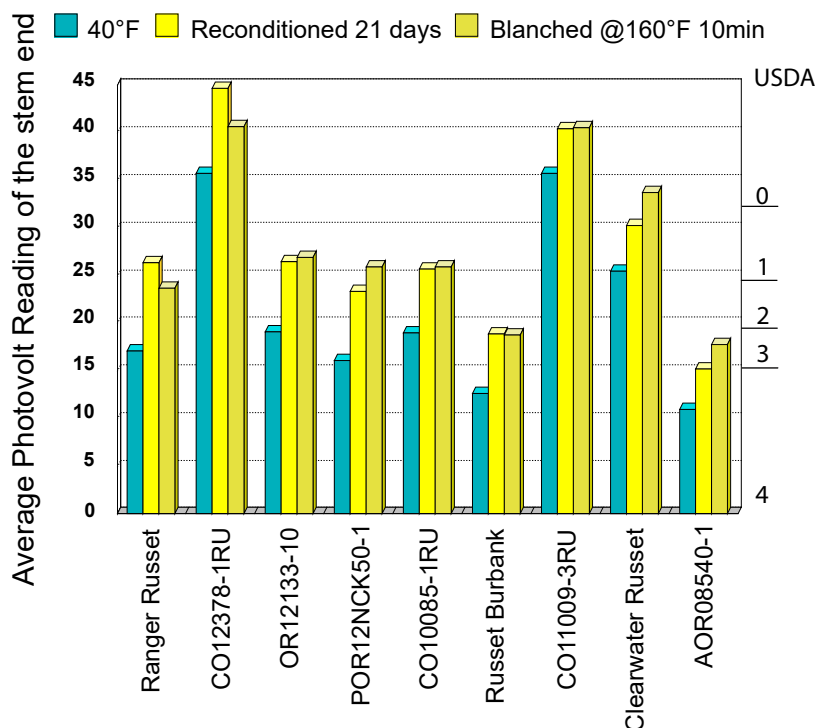


Top: At-harvest and after-storage French fry colors (stem end) of clones in the Regional Trial. Tubers were stored for 60 days at 48, 44 and 40°F. The clones are ranked from best to worst based on fry color of the 40°F-stored tubers. High reflectance values indicate light colored fries.

Bottom: Line graph depicting the effects of storage temperature on change in French fry processing quality (stem end fry color) of the most cold sweetening resistant (CO11009-3RU*, Clearwater Russet*, and CO12378-1RU) and susceptible (Russet Burbank* and AOR08540-1) clones in the Regional Trial. *Indicates similar performance of the clones last year.

2021 Late Harvest Regional Trial

Stored at 40°F 60 days



Reconditioning abilities of clones in the 2021 Regional Trial (3-state averages). Clones were stored at 40°F for 60 days after harvest and then reconditioned at 60°F for 21 days. Top: Stem end fry color before and after reconditioning & blanching. Numbers on side indicate the USDA color rating of the stem end. **Bottom:** Percent improvement of stem and bud end fry color with reconditioning.

2021 Late Harvest Regional Trial

Length to Width Ratios of 8-10 oz Tubers

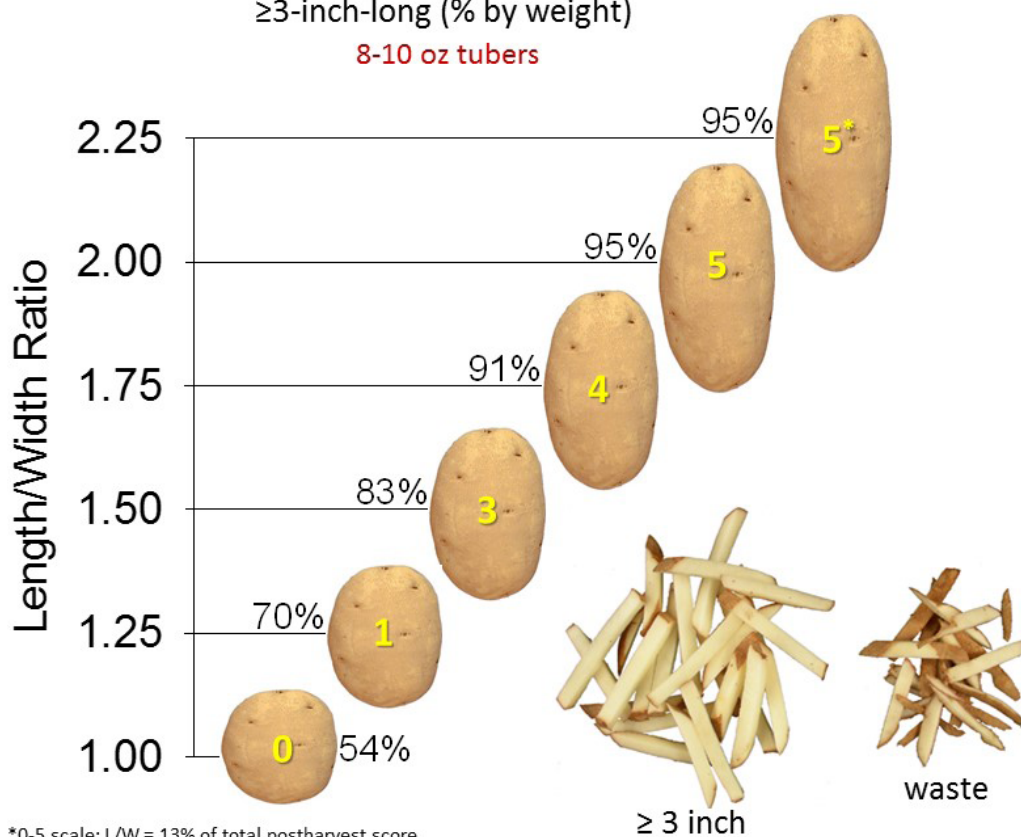
Clone	Length to width ratio						3 State Avg.
	WA	rtg \$	ID	rtg \$	OR	rtg \$	
1 Clearwater Russet	1.70	4	1.63	3	1.53	3	1.62
2 Ranger Russet	1.91	5	2.14	5	1.77	4	1.94
3 Russet Burbank	1.91	5	1.75	4	1.95	5	1.87
4 AOR08540-1	2.01	5	1.86	5	1.86	5	1.91
5 CO10085-1RU	1.41	2	1.77	4	1.67	4	1.61
6 CO11009-3RU	1.69	4	1.85	5	1.63	3	1.72
7 CO12378-1RU	1.60	3	No Sample		1.45	2	1.53
8 OR12133-10	1.80	5	1.84	5	1.75	4	1.79
9 POR12NCK50-1	1.62	3	1.91	5	1.52	3	1.68
Average	1.74		1.84		1.68		1.74

Clone	Width to thickness ratio				3 State Avg.
	WA	ID	OR		
1 Clearwater Russet	1.19	1.17	1.24		1.20
2 Ranger Russet	1.24	1.18	1.24		1.22
3 Russet Burbank	1.20	1.17	1.25		1.20
4 AOR08540-1	1.17	1.14	1.15		1.15
5 CO10085-1RU	1.31	1.17	1.26		1.25
6 CO11009-3RU	1.14	1.11	1.24		1.16
7 CO12378-1RU	1.24	No Sample		1.22	1.23
8 OR12133-10	1.20	1.13	1.21		1.18
9 POR12NCK50-1	1.18	1.17	1.21		1.19
Average	1.21	1.16	1.22		1.20

French Fry Yield vs Tuber L/W Ratio

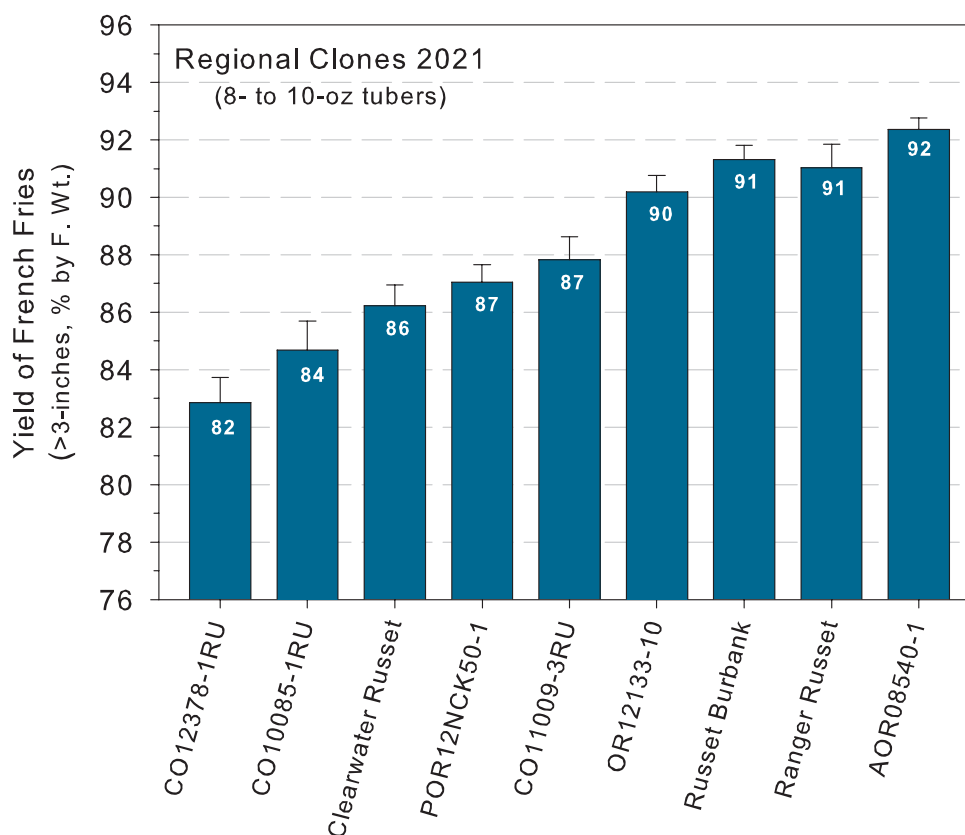
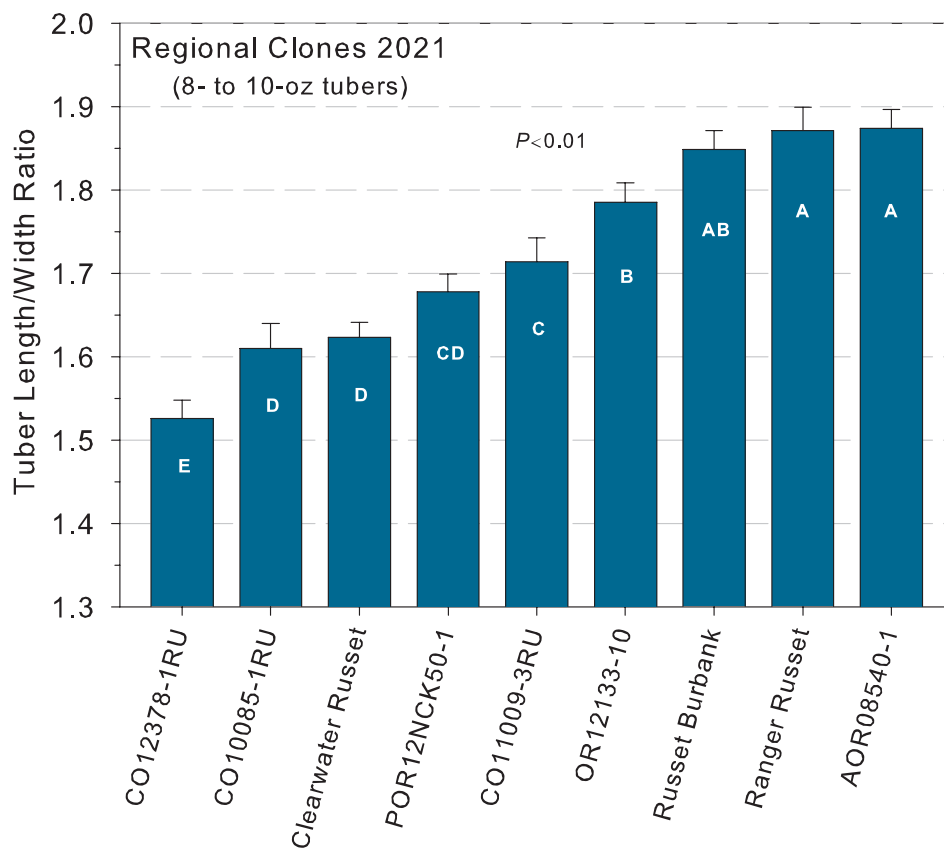
≥3-inch-long (% by weight)

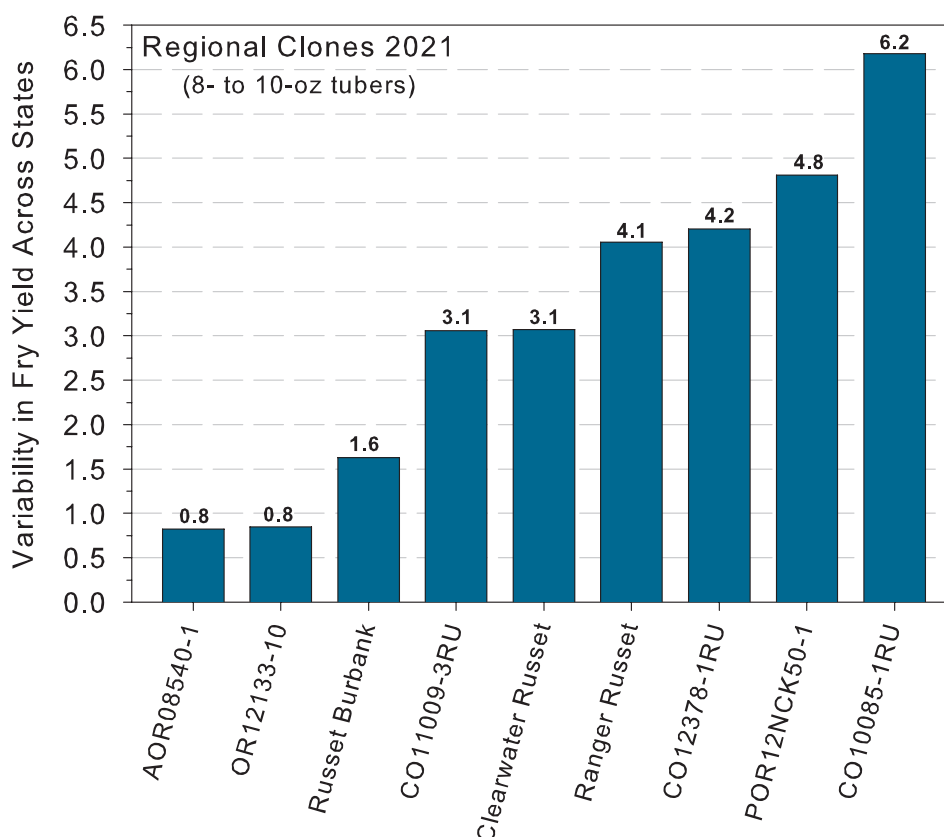
8-10 oz tubers



*0-5 scale; L/W = 13% of total postharvest score

2021 Late Harvest Regional Trial





Relative ranking of clones in the Late Season Regional Trial for variability in yield of French fries prepared from 8- to 10-oz tubers. Variability is expressed as the standard deviation (calculated across ID, WA and OR production sites) for the yield of fries ≥ 3 inches in length (% by fresh weight) from 8- to 10-oz tubers. High values reflect more variation in tuber shape and thus fry yield from state to state. For example, CO10085-1RU had a length to width ratio of 1.61, resulting in 84% of the tuber producing usable French fries ≥ 3 inches in length (page 88). However, tuber shape of this entry also varied the most across production sites (see above), resulting in fry yields ranging from 78 to 89% ($85 \pm 3.57\%$).

Pages 87-88: Tuber length to width ratios and the associated percentage yield of fries. Bars with same letter are not significantly different ($P \leq 0.01$).

2021 Tri-State Specialty Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 6

Vine Kill Date: July 26

Harvest Date: August 9

Days Grown: 111

In-Row Spacing: 8 Inch

The Tri-State Specialty trial is a part of the overall Tri-State Trial effort. This trial consists of clones with unique color and attributes which are primarily evaluated for fresh market suitability. This year's trial compared 5 local reference varieties to 9 new clones. The following is a summary of the Washington field and postharvest results.

Visual Standouts (nice color, skin, size distribution, & shape):

(See also: grading comments and US #1 yield ranking near front of book)

Red-Purple/Yellow flesh:

Yellow flesh:

Suggested Discards:

Standcounts

➤ 50 Day

Full emergence: All entries were greater than 85% emerged at 50 days after planting.

Plant and Tuber Growth & Development

➤ 50 Day Stems per plant

Most: OR11157-1 (3.5), Purple Majesty and A11573-5RYsto (3.4).

Fewest: Yukon Gold (1.7) and NDA8512C-1R.

➤ Average Tuber Number Per Plant

Most: A11537-5RYsto (16.6) and A08120-4Y (16.4).

Fewest: OR11157-1 (4.5) and Yukon Gold (6.6).

➤ Average Tuber Size (oz)

Largest: Yukon Gold (6.4) and Chieftain (5.4).

Smallest: OR11157-1 and A08120-4Y (1.9).

Standcounts

➤ Total Yield and U.S. #1 Yield

Highest: Bintje had the highest total (787 CWT/A) and the highest U.S. #1 yield (693 CWT/A). Chieftain had the second highest total yield (688 CWT/A) and A08122-9RY had the second highest U.S. #1 yield (668 CWT/A).

Lowest: OR11157-1 had the lowest total (123 CWT/A) and U.S. #1 yield (91 CWT/A).

2021 Tri-State Red/Specialty Trial

Postharvest Information

The 2021 red & specialty trial consisted of six red-skinned, five yellow-fleshed and three purple-fleshed clones for a total of 14 entries (5 were control cultivars). An “*” in the summary below indicates similar performance and/or ranking in trials from previous years.

➤ Overall Postharvest Ratings

Highest scoring Overall: OR11157-1

Highest scoring Red: Chieftain

Highest scoring Yellow: Yukon Gold

Highest scoring Purple: OR11157-1

➤ Boiling

Highest scoring Overall: Yukon Gold

Highest scoring Red: A08122-9RY

Highest scoring Yellow: Yukon Gold

Highest scoring Purple: OR11157-1

➤ Baking

Highest scoring Overall: A08122-12rsto

Highest scoring Red: A08122-12rsto

Highest scoring Yellow: Bintje

Highest scoring Purple: OR11157-1

➤ Microwaving

Highest scoring Overall: POR16PG25-2

Highest scoring Red: A11573-5RYsto

Highest scoring Yellow: Bintje

Highest scoring Purple: POR16PG25-2

Details:

- Similar to previous years, culinary scores were high with all entries receiving 65-78% of the total points possible in the 2021 culinary evaluations.
- The top scoring clone was OR11157-1 (purple) with 58.6 points and A08120-4Y* (yellow) was the lowest with 48.5 points. There was a 10.1 point difference between the top and bottom scoring clones.
- The top red entries were Chieftain, Modoc, & A08122-12rsto (average 56 points each). Yukon Gold was the top yellow entry with 58.2 points and OR11157-1 was the top purple entry (and overall) with 58.6 points.
- OR11157-1 showed no sloughing when boiled. All other entries showed slight to moderate sloughing when boiled. All entries showed “slight” to “moderate” after cooking darkening except for Bintje which had none. A08120-4Y* was had a “pastey” texture and all other entries were “creamy” to “fluffy”. The tuber centers of all entries were rated as “mushy” or “fully cooked”. Flavor was “bland” to “good” for all entries.

- In baked evaluations, all entries had “moderate” to “slight” after cooking darkening with A08122-12rsto having the least darkening. The texture of all entries was “creamy” except for A08120-4Y* which had a “pasty” texture. The baked samples of all entries had acceptable flavor (“good” to “bland”) except for POR16PG34-1 and A08120-4Y which rated as “unacceptable”. The skins of baked NDA8512C-1R were rated as “crisp” and all other entries rated as “steamy”. Tuber centers for all entries were rated as “mushy”.
- Microwaving produced no after cooking darkening in Modoc nor Bintje. After cooking darkening in the remaining entries was rated as “moderate” to “slight”. Texture of microwaved samples was favorably rated as “fluffy” or “creamy” except for Modoc, NDA8512C-1R, and A08120-4Y* which rated as “pasty”. The flavor ratings were “unacceptable” for A08120-4Y and A08122-9RY; all other entries were “bland” to “good”. Skins of all entries were rated “steamy” to “fully cooked”. Tuber centers of all entries rated “mushy” to “fully cooked”.
- A08120-4Y produced the lightest chips with a SFA color rating of 3.5 and Modoc produced the darkest with a rating of 5.0 (1-5 scale). All other entries rated 3.7 to 4.8 with an average color of 4.2 overall.
- Cooking time for boiled samples was again assessed this year. Cores of tuber tissue (1.3 cm diameter x 1.3 cm long) from the stem and bud ends of all entries were immersed in boiling water and the time to penetration by a 90-g probe was recorded. Stem cores averaged 5.7 minutes to cook compared with 4.4 minutes for bud end cores. Cooking times (stem end) ranged from 4.1 min (Purple Majesty) to 9.2 min (Modoc*). For the experimental entries, POR16PG25-2 (purple) had the fastest stem end cooking time (4.1 min) and A08122-9RY (red) had the longest cooking time (6.5 min). Overall average cooking time regardless of tuber portion was 5.0 minutes.

Overall Culinary Evaluation Scores

	Clone	Boiled (25 max)	Baked (25 max)	Microwaved (25 max)	Total (75 max)
13	OR11157-1	20.1	18.7	19.8	58.6
7	Yukon Gold	20.3	18.5	19.4	58.2
8	Bintje	18.3	18.6	20.0	56.9
1	Chieftain	19.0	18.6	18.4	56.0
2	Modoc	18.6	18.7	18.6	55.9
3	A08122-12rsto	17.6	19.6	18.6	55.8
12	Purple Majesty	18.2	17.9	19.6	55.7
14	POR16PG25-2	17.8	17.0	20.7	55.5
6	A11573-5RYsto	17.8	18.1	19.4	55.3
5	A08122-9RY	19.8	17.9	16.9	54.6
11	POR16PG34-1	18.9	15.9	19.8	54.6
10	A11576-1Ysto	17.4	17.2	19.0	53.6
4	NDA8512C-1R	18.2	16.9	16.3	51.4
9	A08120-4Y	17.8	15.9	14.8	48.5

Chipped: Aug. 20
 Boiled: Aug. 18
 Microwaved: Aug. 25
 Baked: Aug. 23
 Cooking Time: Aug. 27

2021 Tri-State Specialty Trial

Summaries

ENTRY	TOTAL YIELD					EXTERNAL DEFECTS		
	CWT/A	Tons/A	US # 1's*	US # 2's*	Culls*	1 = Severe	5 =None	
			> 0 oz	> 0 oz	> 0 oz	Growth		
			----- % of Total Yield -----					Knobs
Red Skin/White Flesh								
Chieftain	688	34.4	96	1	3	5	3	5
Modoc	682	34.1	95	4	1	5	5	5
A08122-12Rsto	643	32.2	98	0	2	5	4	5
NDA8512C-1R	558	27.9	88	3	10	5	1	5
Red-Purple/Yellow Flesh								
A08122-9RY	674	33.7	99	0	1	5	5	5
A11573-5RYsto	648	32.4	97	2	1	5	5	5
Yellow Flesh								
Yukon Gold	604	30.2	96	2	2	5	5	5
Bintje	787	39.4	88	3	9	2	5	5
A08120-4Y	445	22.3	97	0	3	5	5	4
A11576-1Ysto	682	34.1	96	3	1	5	5	4
POR16PG34-1	647	32.3	93	5	2	5	4	5
Purple/Purple Flesh								
Purple Majesty	617	30.8	99	1	0	5	5	5
OR11157-1	123	6.2	74	0	26	2	5	5
POR16PG25-2	551	27.5	98	1	1	5	5	5

ENTRY	US # 1 YIELD							Specific Gravity
	CWT/A	Tons/A	0-2 oz*	2-4 oz*	4-6 oz*	6-10 oz*	> 10 oz*	
			-----%					
Red Skin/White Flesh								
Chieftain	658	32.9	3	17	29	42	8	1.065
Modoc	646	32.3	5	26	34	31	4	1.064
A08122-12Rsto	629	31.5	17	52	24	7	0	1.068
NDA8512C-1R	489	24.5	4	19	27	43	7	1.070
Red-Purple/Yellow Flesh								
A08122-9RY	668	33.4	15	52	25	7	1	1.069
A11573-5RYsto	629	31.5	23	56	17	4	0	1.066
Yellow Flesh								
Yukon Gold	582	29.1	3	12	16	42	27	1.080
Bintje	693	34.6	7	35	36	20	2	1.074
A08120-4Y	432	21.6	55	43	2	0	0	1.057
A11576-1Ysto	652	32.6	12	51	29	8	0	1.070
POR16PG34-1	600	30.0	17	54	23	5	0	1.069
Purple/Purple Flesh								
Purple Majesty	608	30.4	18	50	24	8	0	1.070
OR11157-1	91	4.6	56	41	1	2	0	1.061
POR16PG25-2	539	27.0	12	46	27	14	1	1.074

* Percent values may not total 100% due to rounding

ENTRY	SKIN	TUBER	50 DAY STAND	STEMS PER PLANT	AVERAGE TUBER		SIZE	SHAPE
	SET	SHAPE			UNIFORMITY	UNIFORMITY		
	1 = Poor	1 = Round						
	5 = Good	5 = Long			% Emerged	Above Ground	Ounces	Tubers/Plant
							5 = Good	5 = Good
Red Skin/White Flesh								
Chieftain	3.3	1.0	86	2.2	5.4	8.9	3.0	3.0
Modoc	2.8	3.0	86	3.1	4.6	10.3	3.0	3.3
A08122-12Rsto	3.0	1.0	94	3.0	3.1	14.9	4.0	4.0
NDA8512C-1R	2.3	1.0	91	1.9	5.0	7.7	4.0	4.0
Red-Purple/Yellow Flesh								
A08122-9RY	3.0	1.0	94	2.9	3.1	15.3	3.0	4.0
A11573-5RYsto	3.0	1.0	98	3.4	2.7	16.6	4.0	4.0
Yellow Flesh								
Yukon Gold	3.3	2.0	93	1.7	6.4	6.6	1.0	3.0
Bintje	3.3	2.8	95	2.7	4.1	13.4	2.5	1.0
A08120-4Y	4.0	1.0	99	2.4	1.9	16.4	4.0	4.0
A11576-1Ysto	4.0	2.0	99	2.7	3.3	14.2	3.0	3.0
POR16PG34-1	4.0	1.0	99	2.3	3.0	15.1	4.0	3.5
Purple/Purple Flesh								
Purple Majesty	5.0	2.0	94	3.4	3.0	14.5	3.3	4.8
OR11157-1	5.0	5.0	85	3.5	1.9	4.5	4.0	1.3
POR16PG25-2	5.0	2.8	95	3.2	3.4	11.3	4.0	4.0



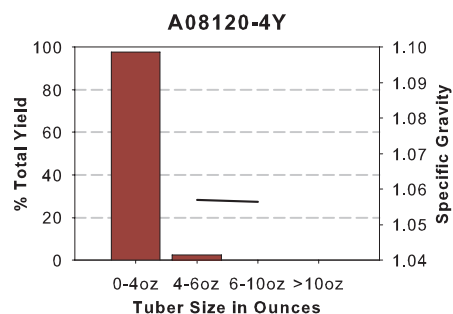
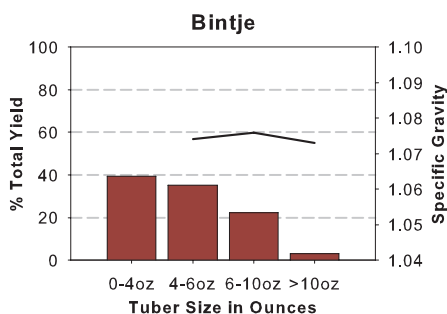
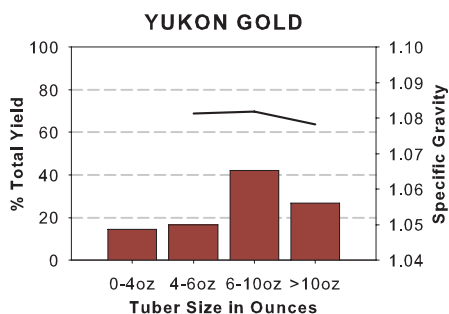
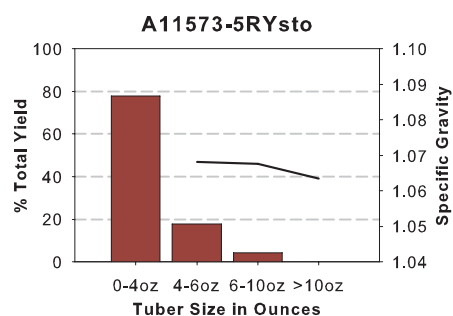
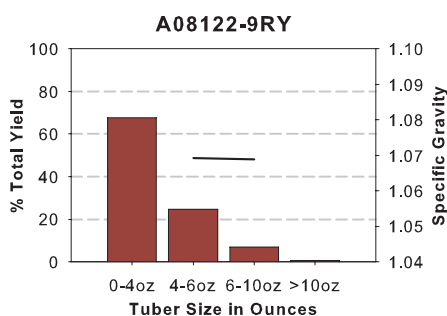
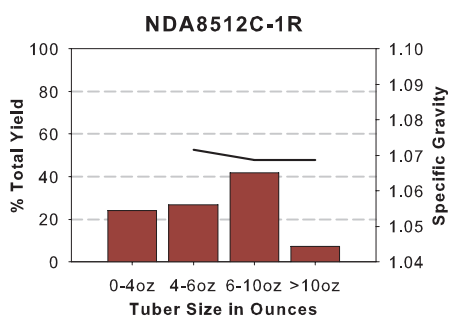
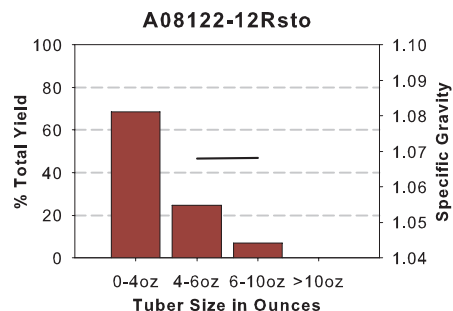
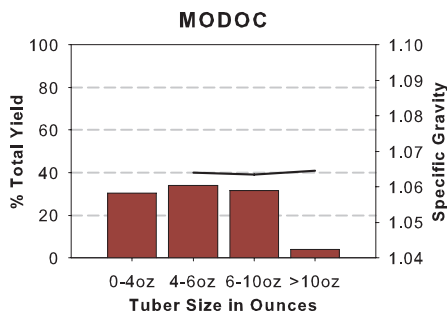
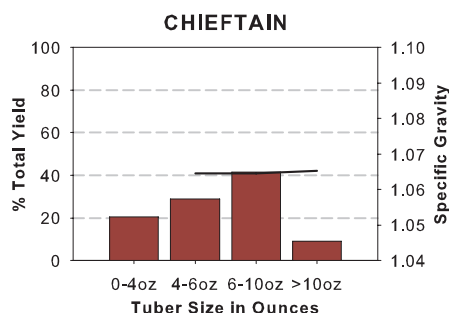
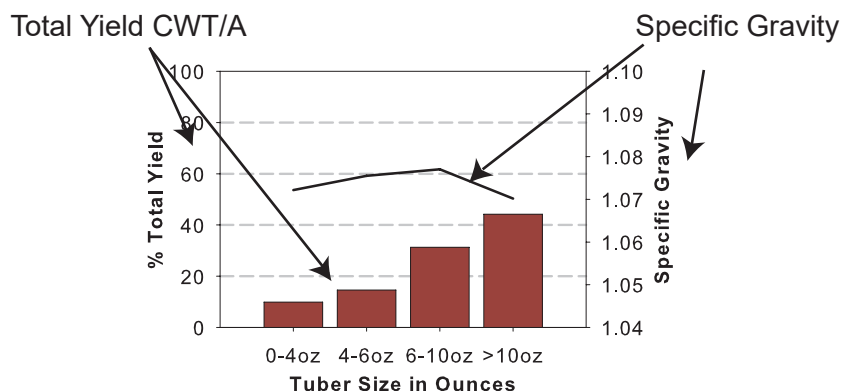
Tri-State Specialty clones awaiting to be evaluated.

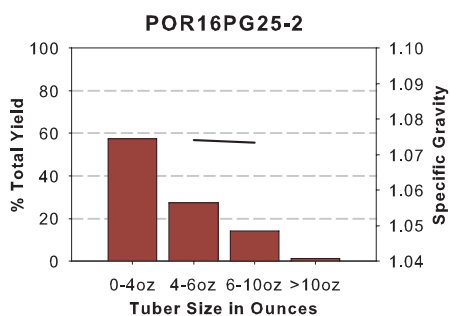
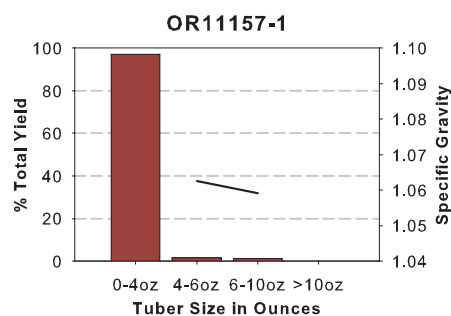
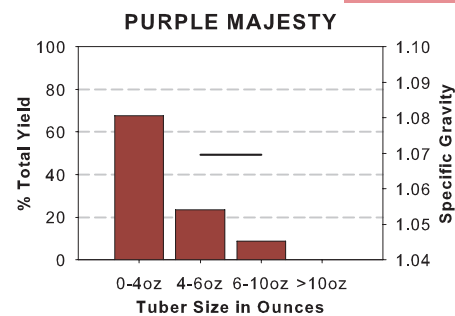
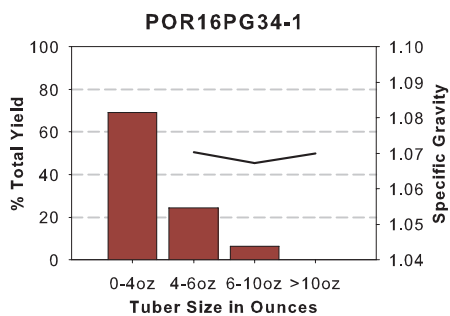
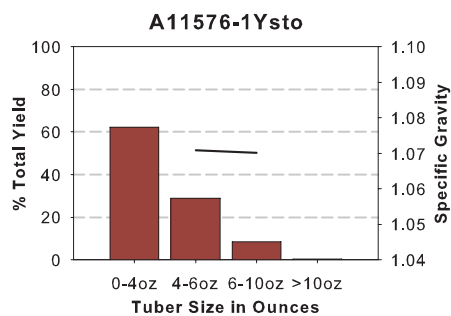
2021 Tri-State Specialty Trial

Tuber Yield and Specific Gravity Distributions

Note: Specific Gravity is based on a sample of U.S. #1 tubers within each size category

8 inch In-Row Spacing





2021 Washington Tri-State Specialty Trial

Red Clone Culinary Evaluation

Boiled

Clone	After Cooking			Tuber Center	Sloughing	Total Rating
	Flavor	Darkening	Texture			
1 Chieftain	3.7	4.2	2.9	4.2	4.0	19.0
2 Modoc	3.4	4.0	2.8	4.3	4.1	18.6
3 A08122-12rsto	2.8	4.3	2.8	4.2	3.5	17.6
4 NDA8512C-1R	3.1	3.8	3.0	4.1	4.2	18.2
5 A08122-9RY	3.4	3.9	3.7	4.4	4.4	19.8
6 A11573-5RYsto	3.1	3.3	2.6	4.3	4.5	17.8
<i>LSD 0.05</i>	<i>ns</i>	<i>0.6</i>	<i>0.7</i>	<i>ns</i>	<i>0.7</i>	<i>2.0</i>
Average	3.3	3.9	3.0	4.2	4.1	18.5

Oven Baked

Clone	After cooking			Tuber Center	Skin Rating	Total Rating
	Flavor	Darkening	Texture			
1 Chieftain	3.2	4.3	3.2	3.7	4.2	18.6
2 Modoc	3.7	4.4	3.0	3.6	4.0	18.7
3 A08122-12rsto	3.4	4.5	3.3	4.2	4.2	19.6
4 NDA8512C-1R	3.0	4.1	2.9	3.7	3.2	16.9
5 A08122-9RY	3.2	3.7	3.2	4.2	3.6	17.9
6 A11573-5RYsto	3.3	3.7	3.3	4.2	3.6	18.1
<i>LSD 0.05</i>	<i>ns</i>	<i>0.7</i>	<i>ns</i>	<i>ns</i>	<i>0.7</i>	<i>1.8</i>
Average	3.3	4.1	3.2	3.9	3.8	18.5

Microwaved

Clone	After cooking			Tuber Center	Skin Rating	Total Rating
	Flavor	Darkening	Texture			
1 Chieftain	3.5	4.2	2.5	4.0	4.2	18.4
2 Modoc	3.5	4.7	2.0	4.2	4.3	18.6
3 A08122-12rsto	3.2	4.3	2.8	4.0	4.3	18.6
4 NDA8512C-1R	2.5	4.3	1.8	3.3	4.3	16.3
5 A08122-9RY	2.3	3.5	2.8	3.8	4.4	16.9
6 A11573-5RYsto	3.8	4.0	2.7	4.5	4.4	19.4
<i>LSD 0.05</i>	<i>1.2</i>	<i>0.9</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>2.5</i>
Average	3.2	4.2	2.3	3.9	4.3	18.0

*Differences between clones equal to or greater than the LSD 0.05 are significant.

2021 Washington Tri-State Specialty Trial

Specialty Clone Culinary Evaluation

Boiled

Clone	Flavor	After Cooking Darkening	Texture	Tuber Center	Sloughing	Total Rating
7 Yukon Gold	4.0	4.4	3.6	4.6	3.7	20.3
8 Bintje	2.5	4.6	3.7	4.2	3.3	18.3
9 A08120-4Y	3.2	3.8	2.4	4.0	4.4	17.8
10 A11576-1Ysto	2.9	3.6	3.0	3.7	4.2	17.4
11 POR16PG34-1	3.2	4.2	3.5	4.2	3.8	18.9
12 Purple Majesty	3.6	4.1	2.7	4.0	3.8	18.2
13 OR11157-1	3.3	4.5	3.3	4.1	4.9	20.1
14 POR16PG25-2	3.6	3.6	3.2	4.2	3.2	17.8
LSD 0.05	0.9	0.9	0.9	ns	0.8	2.8
Average	3.2	4.3	3.2	4.3	3.9	18.8

Oven Baked

Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
7 Yukon Gold	2.8	4.3	3.2	3.9	4.3	18.5
8 Bintje	3.5	4.0	2.9	4.1	4.1	18.6
9 A08120-4Y	2.1	3.9	2.0	3.9	4.0	15.9
10 A11576-1Ysto	2.6	3.4	3.2	3.7	4.3	17.2
11 POR16PG34-1	2.0	3.5	3.2	3.4	3.8	15.9
12 Purple Majesty	3.1	3.9	2.9	4.0	4.0	17.9
13 OR11157-1	3.3	4.0	3.4	4.4	3.6	18.7
14 POR16PG25-2	3.0	3.4	2.5	4.0	4.1	17.0
	1.1	0.7	0.9	0.7	0.7	2.3
Average	2.8	4.1	2.7	4.0	4.2	17.5

Microwaved

Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
7 Yukon Gold	4.0	3.8	3.2	4.0	4.4	19.4
8 Bintje	3.5	4.5	3.3	4.2	4.5	20.0
9 A08120-4Y	2.3	2.7	1.8	3.5	4.5	14.8
10 A11576-1Ysto	3.2	3.3	3.7	4.3	4.5	19.0
11 POR16PG34-1	3.3	3.8	3.8	4.2	4.6	19.8
12 Purple Majesty	3.3	3.5	3.3	4.8	4.6	19.6
13 OR11157-1	3.5	3.8	3.3	4.5	4.7	19.8
14 POR16PG25-2	4.0	3.8	3.3	4.8	4.7	20.7
	1.3	1.0	1.5	1.1	ns	2.2
Average	3.4	3.7	2.8	3.9	4.5	19.1

*Differences between clones equal to or greater than the LSD 0.05 are significant.

Chipping and Boiling Evaluations

		(Chips)	(BOILED Cooking Time)		
Clone	Av of 6 raters		Time to Breakdown (min)		
	SFA		Stem	Bud	Average
1 Chieftain	4.8		5.4	4.2	4.8
2 Modoc	5.0		9.2	4.9	7.0
3 A08122-12rsto	4.0		4.6	4.3	4.4
4 NDA8512C-1R	4.3		5.5	3.5	4.5
5 A08122-9RY	4.7		6.5	4.9	5.7
6 A11573-5RYsto	4.2		5.5	5.0	5.2
7 Yukon Gold	4.5		6.2	4.4	5.3
8 Bintje	3.7		6.3	4.2	5.3
9 A08120-4Y	3.5		5.9	5.3	5.6
10 A11576-1Ysto	3.7		5.7	4.3	5.0
11 POR16PG34-1	3.7		5.0	4.3	4.7
12 Purple Majesty	4.2		4.1	3.5	3.8
13 OR11157-1	4.2		5.7	4.5	5.1
14 POR16PG25-2	4.8		4.1	3.7	3.9
<i>LSD 0.05 *</i>			1.6	0.6	
Average		4.2	5.7	4.4	5.0

*Differences between clones equal to or greater than the LSD 0.05 are significant.
SFA 1 (lightest) to 5 (darkest).



Future potato researcher



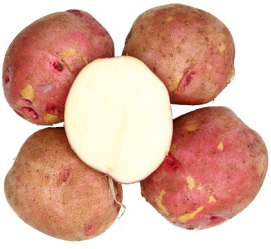
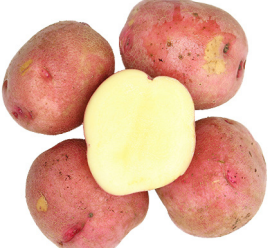
Hail Simulation

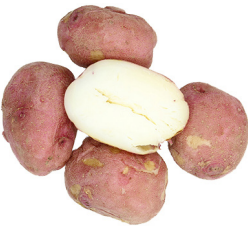


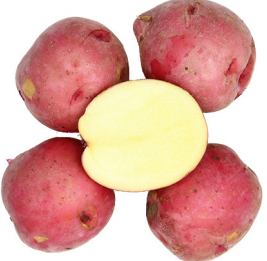
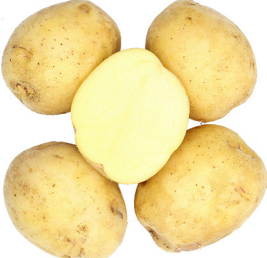
Early spring planting

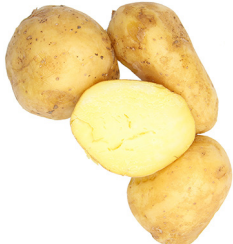
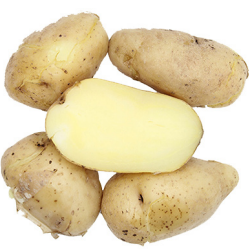


Planting Seed Lot Samples

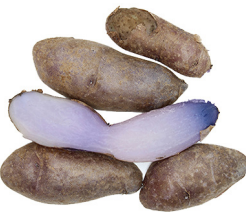
Tubers	WA Tri-State Specialty Trial Comments
Chieftain	
	Tubers: Round tubers. Fair skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, good flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, good flavor, mushy tuber center, steamy skin.
Modoc	
	Tubers: Oblong tubers. Fair skin set; shallow eyes. Baked: slight after cooking darkening, creamy texture, good flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: none after cooking darkening, pastey texture, good flavor, mushy tuber center, steamy skin.
A08122-12Rsto	
	Tubers: Round tubers. Fair skin set; moderate eye depth. Baked: no after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin.
NDA8512C-1R	
	Tubers: Round tubers. Poor skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, crispy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, pasty texture, bland flavor, mushy tuber center, steamy skin.
A08122-9RY	
	Tubers: Round tubers. Fair skin set; moderately deep eyes. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, fluffy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, unacceptable flavor, mushy tuber center, steamy skin.

Chips	Baked	Boiled	Microwaved
Chieftain			
			
Modoc			
			
A08122-12Rsto			
			
NDA8512C-1R			
			
A08122-9RY			
			

Tubers	WA Tri-State Specialty Trial Comments
A11573-5RYsto	
	Tubers: Round tubers. Fair skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: none sloughing, moderate after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, good flavor, fully cooked tuber center, steamy skin.
Yukon Gold	
	Tubers: Round to oblong tubers. Fair skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, fluffy texture, good flavor, fully cooked tuber center. Microwaved: slight after cooking darkening, creamy texture, good flavor, mushy tuber center, steamy skin.
Bintje	
	Tubers: Oblong tubers. Fair skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, good flavor, mushy tuber center, steamy skin. Boiled: moderate sloughing, none after cooking darkening, fluffy texture, bland flavor, mushy tuber center. Microwaved: none after cooking darkening, creamy texture, good flavor, mushy tuber center, fully cooked skin.
A08120-4Y	
	Tubers: Round tubers. Good skin set; shallow eyes. Baked: slight after cooking darkening, pastey texture, unacceptable flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, pasty texture, bland flavor, mushy tuber center. Microwaved: moderate after cooking darkening, pasty texture, unacceptable flavor, mushy tuber center, fully cooked skin.
A11576-1Ysto	
	Tubers: Round to oblong tubers. Good skin set; shallow eyes. Baked: moderate after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: moderate after cooking darkening, fluffy texture, bland flavor, mushy tuber center, fully cooked skin.

Chips	Baked	Boiled	Microwaved
A11573-5RYsto			
			
Yukon Gold			
			
Bintje			
			
A08120-4Y			
			
A11576-1Ysto			
			

Tubers	WA Tri-State Specialty Trial Comments
POR16PG34-1	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, unacceptable flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, fluffy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, fluffy texture, bland flavor, mushy tuber center, fully cooked skin.
Purple Majesty	
	Tubers: Round to oblong tubers. Good skin set; very shallow eyes. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, good flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, bland flavor, fully cooked tuber center, fully cooked skin.
OR11157-1	
	Tubers: Long tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: none sloughing, none after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, good flavor, fully cooked tuber center, fully cooked skin.
POR16PG25-2	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Baked: moderate after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin. Boiled: moderate sloughing, slight after cooking darkening, creamy texture, good flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, good flavor, fully cooked tuber center, fully cooked skin.

Chips	Baked	Boiled	Microwaved
POR16PG34-1			
			
Purple Majesty			
			
OR11157-1			
			
POR16PG25-2			
			

2021 Tri-State Chip Trial

Summaries

ENTRY	TOTAL YIELD					EXTERNAL DEFECTS		
	CWT/A	Tons/A	US # 1's*	US # 2's*	Culls*	1 = Severe	5 = None	
			> 0 oz	> 0 oz	> 0 oz			Growth
			% of Total Yield			Knobs	Cracks	Green
Atlantic	755	37.7	96	0	4	5	5	4
Snowden	777	38.9	97	0	3	5	5	4
AOR12197-4	884	44.2	88	0	12	5	5	3
COOR13270-2	757	37.9	94	0	6	5	5	4
NYOR14Q9-5	872	43.6	95	0	5	5	5	4

ENTRY	US # 1 YIELD							Specific Gravity
	CWT/A	Tons/A	0-2 oz*	2-4 oz*	4-6 oz*	6-10 oz*	> 10 oz*	
			-----%-----					
Atlantic	728	36.4	2	10	20	46	23	1.092
Snowden	757	37.8	1	10	23	41	25	1.085
AOR12197-4	774	38.7	4	14	19	40	22	1.084
COOR13270-2	710	35.5	3	16	26	40	15	1.089
NYOR14Q9-5	831	41.6	1	6	14	33	46	1.086

ENTRY	SKIN SET	L x W RATIO	50 DAY STAND	STEMS PER PLANT	AVERAGE TUBER		SIZE UNIFORMITY	SHAPE UNIFORMITY
	1 = Poor 5 = Good	1 = Round 5 = Long	% Emerged	Above Ground	WEIGHT Ounces	NUMBER Tubers/Plant	1 = Poor 5 = Good	1 = Poor 5 = Good
Atlantic	4.0	1.0	88	2.5	6.5	8.0	3.5	3.8
Snowden	3.0	1.0	85	2.7	6.7	8.0	3.0	3.0
AOR12197-4	3.0	1.0	85	2.9	5.5	11.2	3.5	3.0
COOR13270-2	4.0	1.1	85	2.7	5.5	9.5	3.0	3.0
NYOR14Q9-5	4.0	1.1	86	2.3	7.7	7.9	3.0	3.5

* Percent values may not total 100% due to rounding

2021 Tri-State Chip Trial

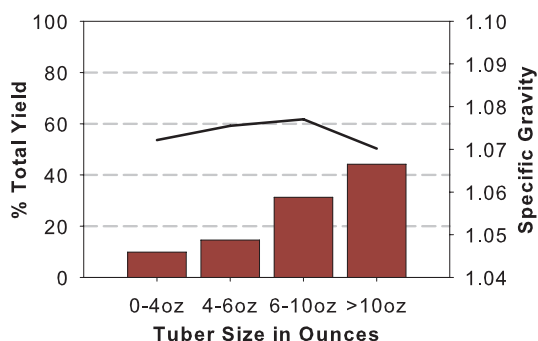
Tuber Yield and Specific Gravity Distributions

Note: Specific Gravity is based on a sample of U.S. #1 tubers within the 6-10 oz category

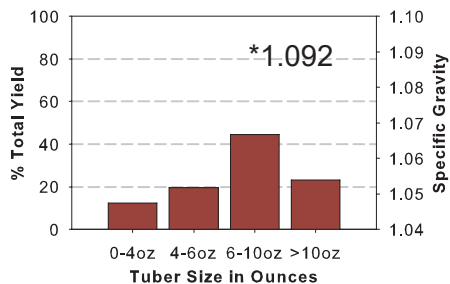
8 inch In-Row Spacing

Total Yield CWT/A

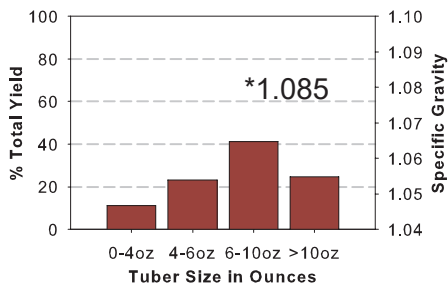
Specific Gravity



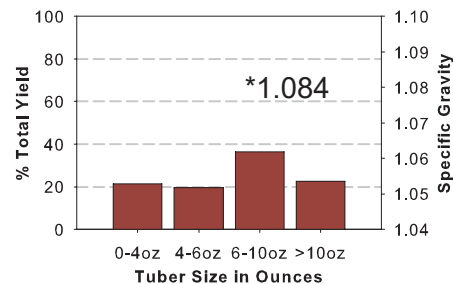
ATLANTIC



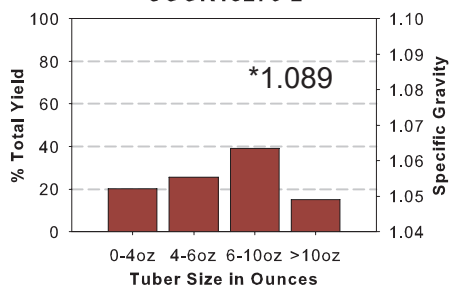
SNOWDEN



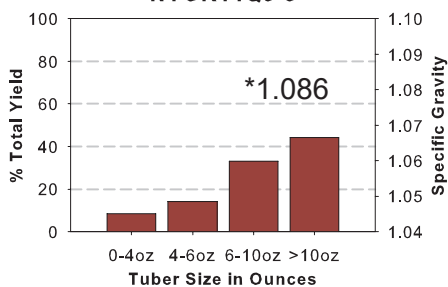
AOR12197-4



COOR13270-2



NYOR14Q9-5



2021 WA Chip Trial

Postharvest Information

Three experimental chipping clones were evaluated in 2021 along with Atlantic and Snowden as check cultivars. Samples were from WSU's Othello, WA Research station.

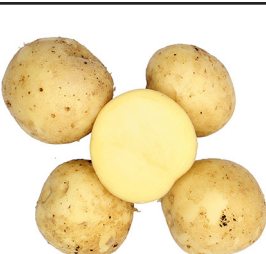
- When averaged over the three fry point intervals, NYOR14Q9-5 produced the lightest chips (1.6) as referenced with the SFA color chart (1-5 (darkest)).
- At harvest; Atlantic, AOR12197-4, and NYOR14Q9-5 had the lightest chip color (1.0). COOR13270-2 produced acceptably light chips but were the darkest with a 2.0 average color.
- After 60 days of storage at 48°F, Snowden and NYOR14Q9-5 produced the lightest chips (2.0) and COOR13270-2 were the darkest in color (4.2).
- After 60 days of storage at 44°F, NYOR14Q9-5 produced the lightest chips (1.8) with Snowden producing the darkest chips (4.2). The average chip fry color for all entries: at harvest was 1.3, after 48°F was 2.8, and after 44°F was 3.1.
- All entries generally remained dormant during the evaluation period with only Snowden showing indication of potential dormancy break at 48°F.

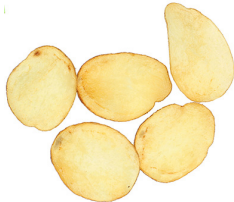
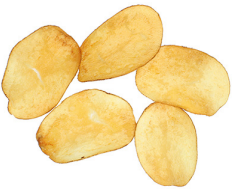
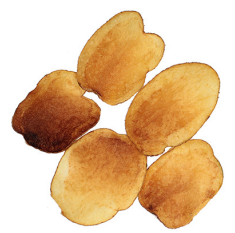
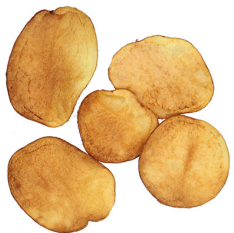
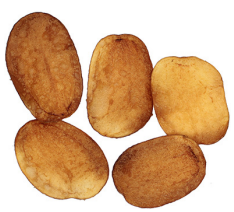
2021 Tri-State Chip Trial

Postharvest Assessments for Storability and Color

Clone	SPROUTING (%) length (in)		SFA Color
Prior to Storage			
1 Atlantic	-	-	1.0
2 Snowden	-	-	1.3
3 AOR12197-4	-	-	1.0
4 COOR13270-2	-	-	2.0
5 NYOR14Q9-5	-	-	1.0
Average	-	-	1.3
48° Storage			
1 Atlantic	0	0	3.0
2 Snowden	0.25	0.125	2.0
3 AOR12197-4	0	0	3.0
4 COOR13270-2	0	0	4.2
5 NYOR14Q9-5	0	0	2.0
Average	0.05	0.025	2.8
44° Storage			
1 Atlantic	0	0	4.0
2 Snowden	0	0	4.2
3 AOR12197-4	0	0	3.0
4 COOR13270-2	0	0	2.4
5 NYOR14Q9-5	0	0	1.8
Average	0	0	3.1
Date test performed:			
Prior to Storage		Sept. 9	
48°F		Nov. 18	
44°F		Nov. 18	

Chips were stored for 60 days at 44°F or 48°F.

Tubers	WA Tri-State Chip Trial Comments
Atlantic	
	Tubers: Round tubers. Good skin set; moderate eye depth. Initial Chips: Light 48°F = relatively dark 44°F = relatively dark
Snowden	
	Tubers: Round tubers. Fair skin set; deep eyes. Initial Chips: Light 48°F = light 44°F = relatively dark
AOR12197-4	
	Tubers: Round tubers. Fair skin set; moderate eye depth. Initial Chips: Light 48°F = relatively dark 44°F = relatively dark
COOR13270-2	
	Tubers: Round tubers. Good skin set; shallow eyes. Initial Chips: Light 48°F = unnacceptably dark 44°F = light
NYOR14Q9-5	
	Tubers: Round tubers. Good skin set; shallow eyes. Initial Chips: Light 48°F = light 44°F = light

Initial Chips	48° F Storage	44° F Storage
Atlantic		
		
Snowden		
		
AOR12197-4		
		
COOR13270-2		
		
NYOR14Q9-5		
		

Index of Clones and Cultivars

Early Harvest Tri-State Trial22-27

A09086-1LB
A09136-9LB
A10130-1
A10594-4sto
A11175-12TE
A11259-1

A11326-1
A12114-7
A12305-2adg
AFA5661-8
AOR11217-3
AOR13064-2

Clearwater Russet
Ranger Russet
Russet Burbank
Russet Norkotah
Shepody

Late Harvest Tri-State Trial28-55

A09086-1LB
A09136-9LB
A10130-1
A10594-4sto
A11175-12TE
A11259-1

A11326-1
A12114-7
A12305-2adg
AFA5661-8
AOR11217-3
AOR13064-2

Clearwater Russet
Ranger Russet
Russet Burbank
Russet Norkotah

Early Harvest Regional Trial56-61

AOR08540-1
AOR10204-3
Clearwater Russet
CO10085-1RU
CO11009-3RU

CO12378-1RU
COA11013-2
OR12133-10
POR12NCK50-1
Ranger Russet

Russet Burbank
Russet Norkotah
Shepody
TX13590-9Ru

Late Harvest Regional Trial62-89

AOR08540-1
AOR10204-3
Clearwater Russet
CO10085-1RU
CO11009-3RU

CO12378-1RU
COA11013-2
OR12133-10
POR12NCK50-1
Ranger Russet

Russet Burbank
Russet Norkotah
TX13590-9Ru

Tri-State Specialty Trial90-107

A08120-4Y
A08122-12Rsto
A08122-9RY
A11573-5RYsto
A11576-1Ysto

Bintje
Chieftain
Modoc
NDA8512C-1R
OR11157-1

POR16PG25-2
POR16PG34-1
Purple Majesty
Yukon Gold

Tri-State Chip Trial108-113

AOR12197-4
Atlantic
COOR13270-2

NYOR14Q9-5
Snowden