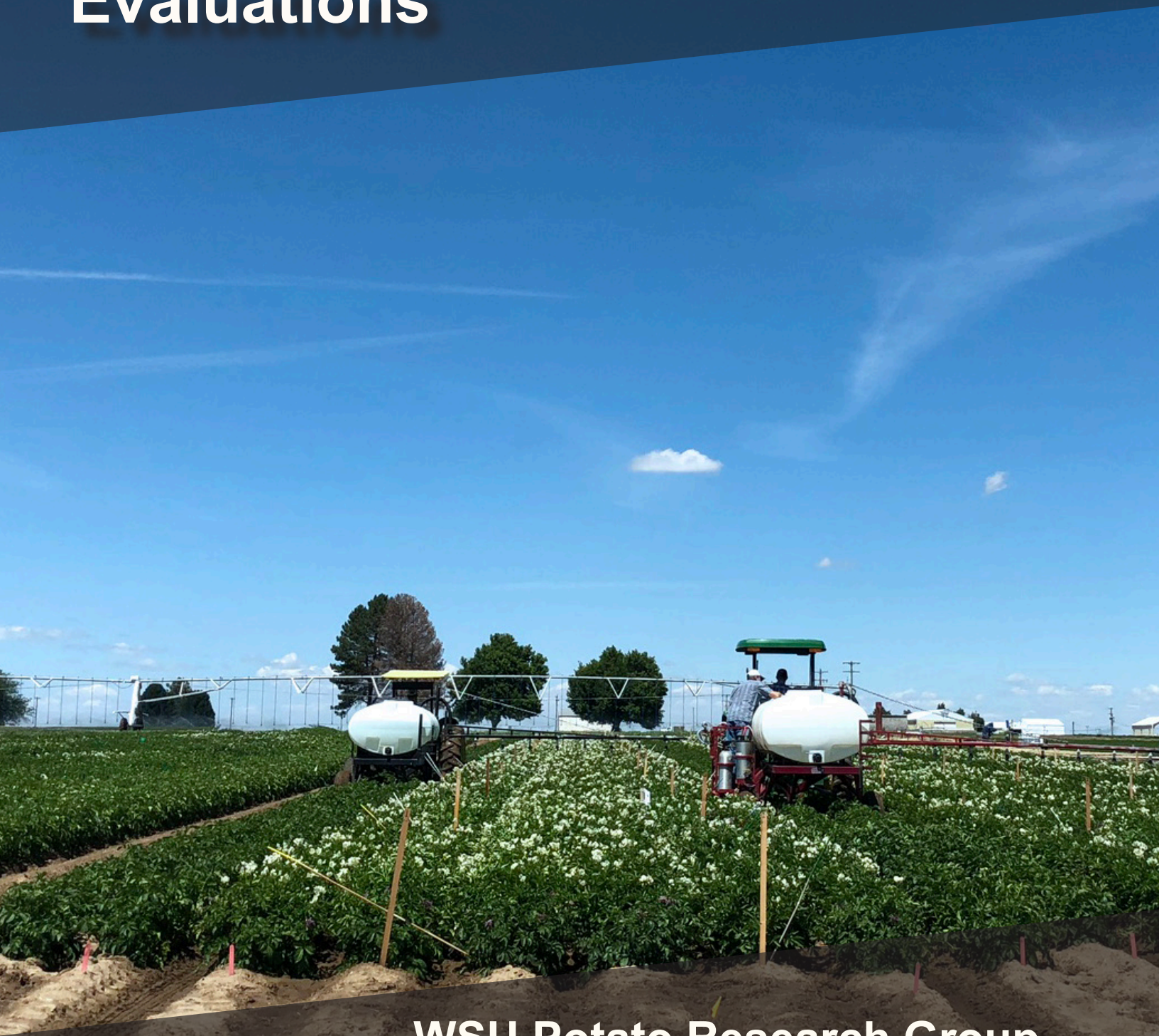


2020 Potato Cultivar Yield and Postharvest Quality Evaluations



WSU Potato Research Group



World Class. Face to Face.

2020 Potato Cultivar Yield and Postharvest Quality Evaluations

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On the cover: Two chemigation
simulators apply different nitrogen rates
to Rainer Russet.

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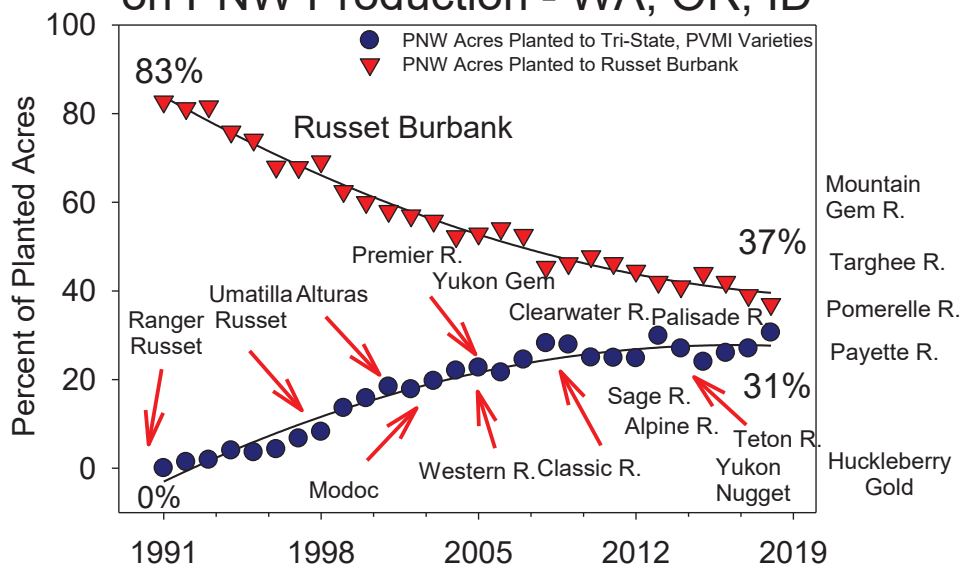
INTRODUCTION

The 2020 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**.

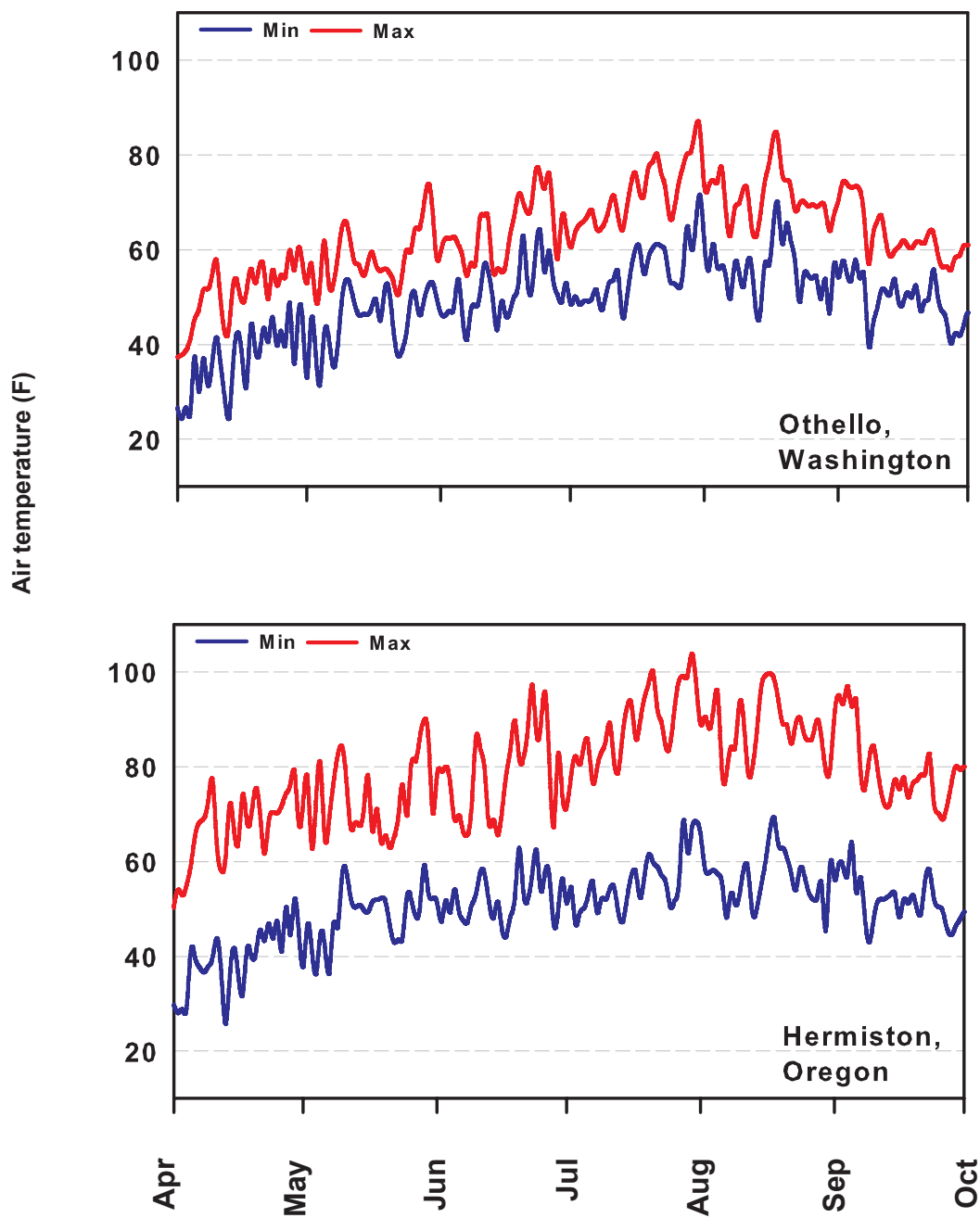
Our mission: to identify and release new potato varieties that will provide profitable, sustainable production for the grower, improved competitiveness for the Washington and NW US potato industry, a healthy, inexpensive food supply for American consumers, and contributions towards a healthy environment. **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 2019 NASS potato variety data has not been available for reasons unknown to the general public). The effect of the Tri-State Potato Variety Development Program on the Northwest potato industry has been substantial. **Ranger Russet, Umatilla Russet, Clearwater Russet, Alturas, and Bannock Russet** are examples of russet cultivars released from the Tri-State program that have greatly benefited the United States and Northwest potato industry, being the 3rd, 4th, 6th, 7th, and 12th most widely grown cultivars in the United States in 2018, respectively, with Tri-State varieties representing 31%, or 266,400 acres, of the fall crop nationally. (NASS, Crop Production, November 2018). **Ranger Russet, Umatilla Russet, and Clearwater Russet** were the 3rd, 4th, and 5th most widely grown cultivars in the PNW (ID, OR, WA) in 2018, respectively, and accounted for 25% of the PNW planted acreage. Varieties recently released by the Tri-State program are now produced on more than 160,900 acres in the Pacific Northwest with value to growers estimated at approximately \$810 million. In the past 16 years, the US farm-gate value of Tri-State varieties has increased by approximately \$240 million.

Impact of Tri-State Potato Varieties on PNW Production - WA, OR, ID



2020 Growing Season Temperatures



Guide to Clone Designations

Example: ATX91137-1Ru

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

Location Codes

Designation		Breeding Program	Selection Program	Other
A	=	Aberdeen, Idaho	Aberdeen, Idaho	
AO	=	Aberdeen, Idaho	Oregon	
AOA	=	Aberdeen, Idaho	Oregon	Aberdeen, Idaho
ATX	=	Aberdeen, Idaho	Texas	
BTX	=	Beltsville, Maryland	Texas	
CO	=	Colorado		
MWTX	=	Madison Wisconsin	Texas	
NDA	=	North Dakota	Aberdeen, Idaho	
NY	=	New York		
PA	=	Prosser, WA	Aberdeen, Idaho	
POR	=	Prosser, WA	Oregon	
TC	=	Texas	Colorado	
TXA	=	Texas	Aberdeen, Idaho	
TXNS	=	Texas		Norkotah Strain

Miscellaneous Designations

PA97B3-2	B	=	Chuck Brown's cross
A93157-6LS	LS	=	Low Sugar
CO94165-3P/P	P/P	=	Purple skin & Purple flesh
A96741-2R	R	=	Red skin
CO94183-1R/R	R/R	=	Red skin / Red flesh
VC0967-2R/Y	R/Y	=	Red skin / Yellow flesh
ATX92230-1Ru	Ru	=	Russet skin
VC1009-1W/Y	W/Y	=	White skin & Yellow flesh
A97066-42LB	LB	=	Late Blight resistance
AC9923PW/Y	PW/Y	=	Purple skin with White eyes/ Yellow flesh
AC9653P/Y	P/Y	=	Purple skin/Yellow flesh
CO977-2P/PW	P/PW	=	Purple skin/Purple & White flesh
A99029-3E	E	=	Early maturing
A0008-1TE	TE	=	Tetonia, ID Selection, Early maturing
A07008-4T	T	=	Tetonia, ID Selection, Late maturing
A06914-3CR	CR	=	Corky Ringspot resistance
A06862-18VR	VR	=	Virus Resistance

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

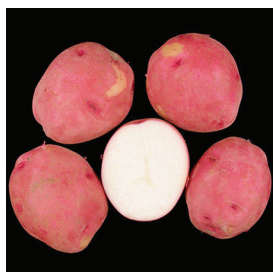
Entry		Early/Late* Harvest		Average Tuber				Merit Scores (5 = Best)			
				US # 1 & 2		Weight/ Number per Plant	Bruise Blackspot/ Shatter	Internal** Issues	Field Performance		Postharvest Processing Performance
									Early/Late Fresh	Early/Late Process	
		Total Yield	Yield > 6 oz	Specific Gravity	oz/number	%					
A071012-4BF	2020	CWT/A 653/998	% of Total 76	1.084	13.0/6.9	20/75	3% IBS	2.3/0.7	4.6/3.4	2.1	
	2019	730/1082	88	1.087	14.6/7.1	3/56	none	3.4/1.6	4.4/4.8	2.7	
	2018	543/1017	87	1.094	14.1/6.9	33/43	none	2.0/1.2	3.2/4.5	2.3	
	2017	478/851	88	1.099	10.4/7.1	0/10	none	1.9/1.8	2.2/2.4	1.7	
	2016	534/915	74	1.093	8.0/9.5	50/78	none	1.5/1.7	3.0/3.0	1.8	
	Large, blocky, plump, uniform tubers with poor skin and deep eyes. Some rot out of field in 2020. High to med specific gravity										
A07769-4	2020	647/1111	82	1.076	11.6/8.6	10/78	none	1.6/1.5	3.0/3.1	2.8	
	2019	767/1193	85	1.073	13.7/8.4	0/92	none	3.0/1.8	3.9/3.0	2.8	
	2018	554/1001	88	1.080	13.3/7.3	18/90	none	2.0/1.3	4.0/3.8	3.6	
	2017	579/969	90	1.083	10.3/8.2	0/68	none	2.4/2.2	4.5/4.6	2.6	
	Tubers larger and plump but often irregularly shaped and bumpy. Light russet skin. Poor specific gravity.										
A10021-5TE	2020	695/909	79	1.072	11.6/7.1	3/75	6% IBS	2.0/0.7	3.8/1.8	3.1	
	2019	777/1011	83	1.076	11.8/8.3	0/43	3% BC	2.3/1.5	4.0/2.5	3.5	
	2018	575/899	80	1.083	12.0/7.2	20/43	3% IBS	2.4/0.7	3.3/3.2	4.2	
	2017	569/797	82	1.085	9.9/7.0	3/21	none	2.4/0.9	4.7/2.3	3.4	
	Tubers large, long and uniform. Skin ugly with occassional severe surface cracking and scab. IBS & specific gravity may be of concern.										
Ranger R.	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	
	2016	465/788	77	1.087	8.4/8.8	58/13	none	NA	2.6/4.6	3.2	
	Long, shape variable, but often uniform; 7 to 9 tubers per plant typical.										
R. Burbank	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	3.9/2.2	2.2	
	2017	428/752	77	1.088	8.2/8.0	13/53	10% HH, 13% BC	1.0/0.9	1.6/3.2	2.3	
	2016	526/734	63	1.085	6.8/9.0	57/57	14% BC, 4% IBS	0.9/1.3	2.0/3.2	2.2	
	Shape typically variable, often with many growth cracks and knobs; 7 to 9 tubers per plant typical.										
Clearwater R.	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.										
R. Norkotah (Fresh Market) only	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	
	2016	473/696	63	1.076	6.8/8.3	24/12	none	2.5/2.5	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	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	-	
	2016	502	82	1.092	11.1/4.9	29/24	none	NA	4.3/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.											

2020 Tri-State Specialty Potato Clones - Washington State University

2020 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	
	2020				
	0-6 oz	6-10oz			
	-----%	-----			
<u>Red Skin/White Flesh*</u>					
Chieftain	788	43	42	3.0	High yield, big size range, light red
Modoc	563	85	12	3.8	Nice red skin, some oblong, most round.
A14046-4R	186	92	8	1.5	Sticky stolons, irregular shapes, discard.
NDA8512C-1R	597	71	26	3.8	Bright red, some growth crack issues,
<u>Red-Purple/Yellow Flesh</u>					
A08122-9RY	603	85	14	3.3	Looked like Chieftain, but smaller. Nice shape.
A11573-5RYsto	274	100	0	3.8	Deep red, small, lots of Rhizoc.
<u>Yellow Flesh</u>					
Yukon Gold	567	23	43	2.8	Larger, nice yellow, lots of Rhizoc.
A08120-4Y	92	100	0	3.3	Small, pink eyes, lots of Rhizoc.
A08123-5Ysto	385	85	14	2.8	Nice skin, yellow, but some had powdery scab.
A11635-1RYsto	475	66	20	2.8	Ugly skin - russetting. Discard.

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

Chieftain



Modoc



A14046-4R



NDA8512C-1R



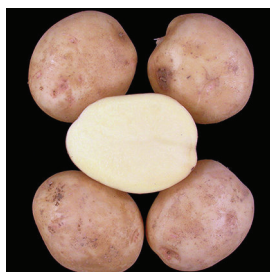
A08122-9Y



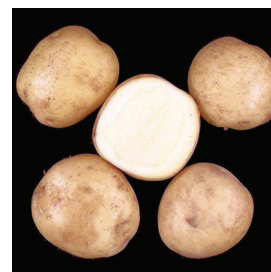
A11573-5RYsto



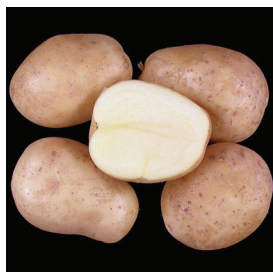
Yukon Gold



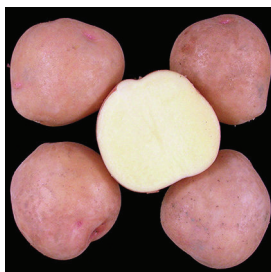
A08120-4Y



A08123-5Ysto



A11635-1RYsto



At-Harvest Grading Comments & Fresh Market Appearance

Newest Lines - 2020 Tri-State Trials			
Fresh Market Appearance 1-5 (5 = Best)			
Clone	2020	2019	Tuber Appearance Comments*
Early Harvest Tri-State			
Ranger Russet	2.0	2.3	Long, skinny, lots of rot.
Russet Burbank	1.0	2.3	Lots of rot and knobs.
Russet Norkotah	3.7	3.3	Smaller, with dark russetting, typy.
Clearwater Russet	4.0	-	Small, dark russet, typy.
Shepody	2.7	2.0	Large, light skin, nonuniform shape.
A09119-4LB	2.0	-	Nonuniform shape, short, light skin.
A10594-4sto	3.0	-	Good length and size, ugly skin.
A11188-1	1.3	-	Powdery scab, large, looks like Shepody.
A11271-2TE	3.0	-	Small, short, not an early variety, medium russet.
A12305-2adg	3.3	-	A bit short, smaller, skinning, not an early variety.
AFA5661-8	2.0	-	Light russet, range of sizes, a bit short. Ugly.
AOR11217-3	3.7	3.3	Typy, looks like Norkotah, Dark Russet, long.
COA11013-2	2.7	2.0	Good length, mostly typy, medium russet, ugly skin
Late Harvest Tri-State			
Ranger Russet	2.5	3.0	A bit flat, good length, eyes a bit deep.
Russet Burbank	2.3	2.3	Good length, lots of knobs and US #2s.
Russet Norkotah	3.5	3.3	Nice shape, skin and size.
Clearwater Russet	3.0	-	A bit short, typy.
A09119-4LB	1.5	-	Plump, some round, some rot, rough shapes.
A10594-4sto	3.0	-	Nice uniform shape, good length, feathery skin.
A11188-1	1.5	-	Large, lumpy, plump shape, light skin.
A11271-2TE	2.5	-	Small ones, round, severe greening.
A12305-2adg	2.3	-	Ok length, lots of US #2s.
AFA5661-8	2.3	-	A bit short, light skin, mix of shapes.
AOR11217-3	3.3	3.5	Good length, shape mostly uniform, somewhat typy.
COA11013-2	2.3	2.8	Smaller, good length, lots of 2s. Feathery skin, ok shape.

*Typy - Visually appealing, uniform tuber shape.

AOR11217-3



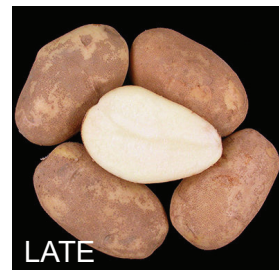
A10594-4sto



Clearwater Russet



AOR11217-3



At-Harvest Grading Comments & Fresh Market Appearance

Advanced Lines - 2020 Regional Trials				
Fresh Market Appearance				
1-5 (5 = Best)				
Clone	2020	2019	2018	Tuber Appearance Comments*
Early Harvest Regional				
Ranger Russet	2.5	2.3	3.3	Long, skinny, lots of rot.
Russet Burbank	2.7	2.0	2.0	Large, long, lots of rot.
Russet Norkotah	3.0	4.0	3.0	Smaller, typy, rhizoc, lots of rot.
Clearwater Russet	4.0	-	-	Typy, dark russetting, skinning.
Shepody	2.0	2.0	2.0	Longer, light skin, nonuniform shape.
A071012-4BF	2.0	3.3	2.7	Ugly skin, some long, some round, feathery russet.
A07769-4	2.0	3.0	2.3	Some round, smaller, some long.
A10021-5TE	2.3	2.3	2.3	Scab, skin cracks, ugly skin.
AOR08540-1	3.0	3.7	3.7	Mostly typy, some odd shapes, medium russets.
AOR10204-3	2.7	2.3	3.0	Lots of lenticils, nonuniform shape, cracks and rot.
CO10085-1RU	2.0	-	-	Lots of rot, long and pointy, lenticils prevelant.
CO10087-4RU	4.0	4.0	-	Typy, smooth skin, medium russet.
CO10091-1RU	3.5	3.7	-	Typy, but short, nice medium russet skin. Not early!
CO11009-3RU	4.0	-	-	Typy dark russet. Good length, skinny, smaller.
OR12133-10	2.0	2.0	2.7	Short, light russet, ugly skin.
POR12NCK50-1	3.0	3.0	3.7	Mostly typy, dark russet, feathered skin, uniform size.
TX13590-9Ru	2.3	-	-	Many different shapes and sizes, nonuniform shape.
Late Harvest Regional				
Ranger Russet	2.3	2.5	2.5	Long, somewhat typy, some rough.
Russet Burbank	2.3	2.0	2.5	Mostly typy, some irregular ones, medium russet.
Russet Norkotah	3.0	3.3	3.3	Smaller, lots of rot, somewhat typy.
Clearwater Russet	3.5	-	-	Mostly typy, poor skin set. Exposed lenticils.
A071012-4BF	1.0	2.5	2.3	Large, ugly, rot, rough, knobs.
A07769-4	2.3	2.5	2.8	Shape irregular, bumpy, plump, larger, light skinned.
A10021-5TE	1.0	1.8	2.0	Severe skin cracks, large, long, ugly skin.
AOR08540-1	1.3	3.0	2.8	Light skin, shape a bit irregluar, ugly skin, larger.
AOR10204-3	2.0	2.8	2.8	Most are US #2s, irregular shapes.
CO10085-1RU	2.5	-	-	Smaller, somewhat typy, a lot of smaller ones.
CO10087-4RU	3.5	3.0	-	Smaller, light to medium russet, somewhat typy.
CO10091-1RU	3.0	2.5	-	Mostly round and flat, some longer. Medium russet.
CO11009-3RU	3.5	-	-	Nice dark skin, typy, a bit short, some #2s.
OR12133-10	2.5	-	-	Large, a bit short, plump, some scab.
POR12NCK50-1	3.0	2.5	3.0	Mostly typy, skin is an issue, ok length.
TX13590-9Ru	2.0	-	-	Softballs and baseballs, irregular shapes.

*Typy - Visually appealing, uniform tuber shape

Clearwater Russet



AOR08540-1



POR12NCK50-1



CO10087-4RU



FRESH MARKET MERIT - NEWEST LINES

2018-2020

(5 = best) - Entries ranked by means

EARLY HARVEST - Fresh Market Merit Scores				
Entry	Mean	2020	2019	2018
1 AOR11217-3	3.5	4.3	2.7	-
2 A12305-2adg	3.0	3.0	-	-
3 Russet Norkotah	2.0	1.7	2.1	2.3
4 Clearwater Russet	2.0	2.0	-	-
5 Ranger Russet	1.6	1.8	1.8	1.4
6 A11188-1	1.6	1.6	-	-
7 Russet Burbank	1.6	1.3	1.7	1.9
8 COA11013-2	1.5	2.4	0.7	-
9 A10594-4sto	1.3	1.3	-	-
10 A11271-2TE	1.2	1.2	-	-
11 AFA5661-8	0.9	0.9	-	-
12 A09119-4LB	0.8	0.8	-	-

LATE HARVEST - Fresh Market Merit Scores				
Entry	Mean	2020	2019	2018
1 AOR11217-3	3.5	3.1	3.9	-
2 Russet Norkotah	2.7	3.5	2.6	2.1
3 Clearwater Russet	2.5	2.5	-	-
4 A10594-4sto	2.3	2.3	-	-
5 A12305-2adg	2.3	2.3	-	-
6 A11271-2TE	2.2	2.2	-	-
7 COA11013-2	1.9	2.1	1.7	-
8 Ranger Russet	1.5	1.6	2.1	0.9
9 AFA5661-8	1.5	1.5	-	-
10 A09119-4LB	1.2	1.2	-	-
11 Russet Burbank	1.0	1.3	1.2	0.5
12 A11188-1	0.5	0.5	-	-

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 **2016-2020**

(5 = best) - Entries ranked by means

EARLY HARVEST - Fresh Market Merit Scores						
Entry	Mean	2020	2019	2018	2017	2016
1 AOR08540-1	3.2	3.8	3.0	3.0	-	-
2 POR12NCK50-1	3.1	3.7	2.6	2.9	3.4	-
3 Russet Norkotah	3.1	1.8	3.4	2.8	5.0	2.5
4 Clearwater Russet	2.8	2.8	-	-	-	-
5 AOR10204-3	2.8	2.1	2.5	3.8	-	-
6 CO10087-4RU	2.4	2.9	1.9	-	-	-
7 Ranger Russet	2.3	1.4	1.7	2.6	3.1	2.8
8 A10021-5TE	2.3	2.0	2.3	2.4	2.4	-
9 A07769-4	2.2	1.6	3.0	2.0	2.4	-
10 A071012-4BF	2.2	2.3	3.4	2.0	1.9	1.5
11 OR12133-10	2.1	2.3	1.9	2.1	-	-
12 TX13590-9Ru	2.1	2.1	-	-	-	-
13 CO11009-3RU	1.9	1.9	-	-	-	-
14 Russet Burbank	1.4	1.3	1.6	2.4	1.0	0.9
15 CO10091-1RU	1.3	1.3	1.3	-	-	-
16 CO10085-1RU	1.0	1.0	-	-	-	-

LATE HARVEST - Fresh Market Merit Scores						
Entry	Mean	2020	2019	2018	2017	2016
1 POR12NCK50-1	2.3	2.7	2.3	2.2	1.9	-
2 Russet Norkotah	2.2	1.3	2.6	2.0	2.6	2.5
3 Clearwater Russet	2.1	2.1	-	-	-	-
4 CO11009-3RU	2.0	2.0	-	-	-	-
5 OR12133-10	2.0	2.1	1.8	2.0	-	-
6 A07769-4	1.7	1.5	1.8	1.3	2.2	-
7 CO10091-1RU	1.6	1.7	1.4	-	-	-
8 AOR08540-1	1.6	1.1	2.3	1.3	-	-
9 TX13590-9Ru	1.6	1.6	-	-	-	-
10 CO10085-1RU	1.5	1.5	-	-	-	-
11 AOR10204-3	1.4	0.9	1.9	1.5	-	-
12 A071012-4BF	1.4	0.7	1.6	1.2	1.8	1.7
13 CO10087-4RU	1.3	1.2	1.5	-	-	-
14 Ranger Russet	1.3	1.1	1.4	0.9	1.0	2.2
15 Russet Burbank	1.2	1.3	1.3	1.3	0.9	1.3
16 A10021-5TE	1.0	0.7	1.5	0.7	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.

PROCESS MARKET MERIT - NEWEST LINES **2018-2020**

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

EARLY HARVEST - Process Market Merit Scores				
Entry	Field Performance Mean	Field Performance Only*		
		2020	2019	2018
1 AOR11217-3	4.8	4.8	4.9	-
2 A12305-2adg	4.4	4.4	-	-
3 Shepody	3.4	3.3	3.4	3.4
4 A11188-1	3.3	3.3	-	-
5 COA11013-2	3.2	4.1	2.3	-
6 Russet Burbank	3.0	1.6	3.6	3.8
7 Ranger Russet	3.0	1.8	3.8	3.4
8 A10594-4sto	2.4	2.4	-	-
9 Clearwater Russet	2.2	2.2	-	-
10 Russet Norkotah	1.9	1.6	1.6	2.6
11 AFA5661-8	1.5	1.5	-	-
12 A09119-4LB	1.3	1.3	-	-
13 A11271-2TE	1.0	1.0	-	-

*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		2020		2019		2018	
	Field Mean	Post Harvest Mean	Field	Post Harv	Field	Post Harv	Field	Post Harv
1 AOR11217-3	4.5	3.7	4.5	3.4	4.5	3.9	-	-
2 A12305-2adg	4.2	2.4	4.2	2.4	-	-	-	-
3 AFA5661-8	4.1	2.7	4.1	2.7	-	-	-	-
4 Clearwater Russet	4.1	2.4	4.1	2.4	-	-	-	-
5 Ranger Russet	3.2	3.1	3.8	2.8	3.5	3.2	2.4	3.3
6 COA11013-2	2.6	3.4	2.9	3.1	2.3	3.6	-	-
7 A10594-4sto	2.3	3.3	2.3	3.3	-	-	-	-
8 Russet Burbank	1.7	2.2	1.6	1.8	2.1	2.6	1.3	2.3
9 Russet Norkotah	1.6	na	1.5	na	1.6	na	1.6	na
10 A11188-1	1.5	1.8	1.5	1.8	-	-	-	-
11 A11271-2TE	1.0	3.1	1.0	3.1	-	-	-	-
12 A09119-4LB	0.9	2.9	0.9	2.9	-	-	-	-

For more information on these cultivars, see the Early and Late Harvest Tri-State Trial Sections in this Book. The dash (" - ") indicates the clone was not yet entered into the trial. Varieties with 'fresh' were designated for direct processing or fresh market only and are indicated with "na".

PROCESS MARKET MERIT - ADVANCED LINES

2016-2020

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

EARLY HARVEST - Process Market Merit Scores						
Entry	Field Performance Mean	Field Performance Only*				
		2020	2019	2018	2017	2016
1 Clearwater Russet	4.5	4.5	-	-	-	-
2 POR12NCK50-1	4.2	4.7	4.2	4.1	3.7	-
3 OR12133-10	4.1	4.0	3.8	4.4	-	-
4 AOR08540-1	4.1	4.3	4.0	3.9	-	-
5 A07769-4	3.8	3.0	3.9	4.0	3.5	4.5
6 A071012-4BF	3.8	4.6	4.4	3.2	4.3	2.2
7 Shepody	3.6	3.2	3.9	3.7	3.9	3.5
8 A10021-5TE	3.6	3.8	4.0	3.3	3.3	-
9 AOR10204-3	3.4	2.7	4.0	3.4	-	-
10 TX13590-9Ru	3.3	3.3	-	-	-	-
11 Ranger Russet	3.2	2.7	3.4	3.2	3.7	3.2
12 Russet Burbank	2.8	2.7	3.3	2.5	3.9	1.8
13 CO10087-4RU	2.8	3.4	2.2	-	-	-
14 Russet Norkotah	2.6	1.4	2.7	3.2	2.5	3.0
15 CO10085-1RU	2.1	2.1	-	-	-	-
16 CO11009-3RU	2.0	2.0	-	-	-	-
17 CO10091-1RU	1.1	1.2	1.0	-	-	-

*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

2016-2020

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

LATE HARVEST - Process Market Merit Scores													
Field & Postharvest Processing Performance													
All Years													
Entry		Field Mean	Post Harvest Mean	2020		2019		2018		2017		2016	
				Field	Post Harv	Field	Post Harv	Field	Post Harv	Field	Post Harv	Field	Post Harv
1	Clearwater Russet	3.8	2.5	3.8	2.5	-	-	-	-	-	-	-	-
2	CO10085-1RU	3.8	2.1	3.8	2.1	-	-	-	-	-	-	-	-
3	POR12NCK50-1	3.7	3.0	4.0	2.8	4.5	3.4	3.3	2.6	3.7	3.2	2.9	-
4	A071012-4BF	3.6	2.1	3.4	2.1	4.8	2.7	4.5	2.3	2.4	1.7	3.0	1.8
5	A07769-4	3.6	3.0	3.1	2.8	3.0	2.8	3.8	3.6	4.6	2.6	-	-
6	CO11009-3RU	3.6	3.9	3.6	3.9	-	-	-	-	-	-	-	-
7	Ranger Russet	3.4	3.1	2.7	2.8	3.2	3.2	3.6	4.0	2.9	2.4	4.6	3.2
8	Russet Burbank	2.6	1.9	2.2	1.3	2.5	1.5	2.2	2.2	3.2	2.3	3.2	2.2
9	OR12133-10	2.5	2.9	3.7	2.4	1.2	2.4	2.6	3.9	2.6	-	-	-
10	A10021-5TE	2.5	3.6	1.8	3.1	2.5	3.5	3.2	4.2	-	-	-	-
11	AOR10204-3	2.4	na	2.1	na	3.1	na	1.9	na	-	-	-	-
12	AOR08540-1	2.3	2.7	2.4	2.7	1.9	na	2.5	na	-	-	-	-
13	TX13590-9Ru	1.9	na	1.9	na	-	-	-	-	-	-	-	-
14	CO10087-4RU	1.8	2.7	2.0	2.4	1.7	3.0	-	-	-	-	-	-
15	CO10091-1RU	1.8	2.0	1.9	1.8	1.6	2.1	-	-	-	-	-	-
16	Russet Norkotah	1.6	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
<u>100 lb Burlap Sacks</u>					
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.

2020 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 ±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 ±1 uniformity)	6**
44°F fry color (0-5 ±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 ≥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.

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.

2020 Early Harvest Tri-State Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 2

Vine Kill Date: July 24

Harvest Date: August 10

Days Grown: 113

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 2020 trial compared 5 local reference varieties to 8 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

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

Yield and Economic Data

➤ Total Yield and U.S. #1 Yield

Highest: COA11013-2 had the highest total yield (759 CWT/A) and the U.S. #1 yield (664 CWT/A). A12305-2adg had the second highest total yield (676 CWT/A); and A11188-1 had the second highest U.S. #1 yield (622 CWT/A).

Lowest: AFA5661-8 had the lowest total yield (495 CWT/A) and the U.S. #1 yield (423 CWT/A). A10594-4sto had the second lowest total yield (514 CWT/A) and the second lowest U.S. #1 yield (431 CWT/A).

➤ % U.S. #1's (greater than 4 oz)

Highest: A11188-1 (94%) and AOR11217-3 (89%).

Lowest: Russet Burbank (75%) and Ranger Russet (81%).

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

Highest: COA11013-2 (20.7 Tons/A), AOR11217-3 (20.3 Tons/A), and A12305-2adg (20.1 Tons/A).

Lowest: Russet Norkotah (13.4 Tons/A).

➤ Gross Return (\$/acre)

Fresh Market Highest: COA11013-2 and AOR11217-3.

Fresh Market Lowest: Russet Norkotah, A11271-2TE, and AFA5661-8.

Process Market Highest: COA11013-2, A12305-2adg, and AOR11217-3.

2020 Early 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
Ranger Russet	622	BCD	31.1	81	5	14	63	19.6	76	23.6
Russet Burbank	673	AB	33.7	75	3	22	53	17.7	68	23.0
Russet Norkotah	554	DEF	27.7	85	2	13	48	13.4	63	17.4
Clearwater Russet	609	BCDE	30.5	85	2	13	46	13.9	61	18.4
Shepody	671	AB	33.6	87	4	9	53	17.8	86	28.9
A09119-4LB	569	CDEF	28.5	83	2	15	58	16.5	68	19.5
A10594-4sto	514	EF	25.7	83	5	11	67	17.2	78	20.2
A11188-1	663	ABC	33.2	94	3	3	55	18.1	92	30.5
A11271-2TE	522	EF	26.1	86	3	11	58	15.1	70	18.3
A12305-2adg	676	AB	33.8	87	3	11	59	20.1	73	24.9
AFA5661-8	495	F	24.8	86	2	12	63	15.5	73	18.2
AOR11217-3	640	BCD	32.0	89	3	8	63	20.3	75	24.2
COA11013-2	759	A	38.0	87	2	10	54	20.7	68	26.0

ENTRY	US # 1 YIELD						> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%)		
	> 4 oz	STATS**	Tons/A	4-7 oz*	7-14 oz*	> 14 oz*		(8-12 oz tubers)		
				-----	-----	-----		% HH	% BC	% IBS
	CWT/A			----- % -----						
Ranger Russet	502	BCD	25.1	19	65	16	1.076	0	0	0
Russet Burbank	503	BCD	25.2	21	60	19	1.074	23	20	0
Russet Norkotah	471	D	23.5	43	52	4	1.070	0	0	0
Clearwater Russet	517	BCD	25.8	45	52	2	1.075	0	0	0
Shepody	587	AB	29.3	14	42	44	1.070	0	0	0
A09119-4LB	473	CD	23.7	29	52	18	1.077	0	0	0
A10594-4sto	431	D	21.5	20	66	13	1.083	30	25	0
A11188-1	622	A	31.1	7	38	54	1.065	0	0	0
A11271-2TE	450	D	22.5	31	62	7	1.076	7	0	0
A12305-2adg	589	AB	29.4	31	61	8	1.080	0	0	0
AFA5661-8	423	D	21.2	27	60	13	1.075	0	0	0
AOR11217-3	571	ABC	28.6	29	60	11	1.081	0	0	0
COA11013-2	664	A	33.2	36	57	7	1.078	0	0	3

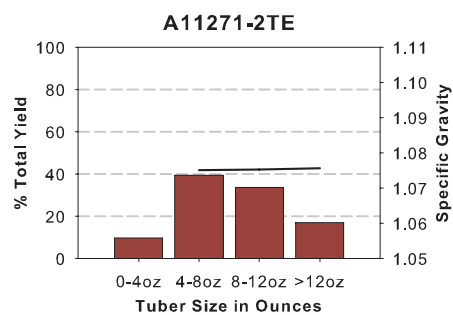
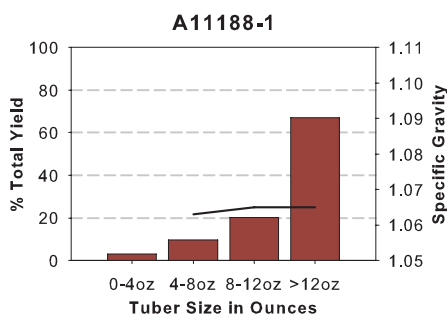
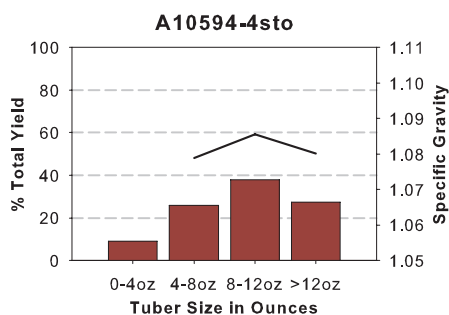
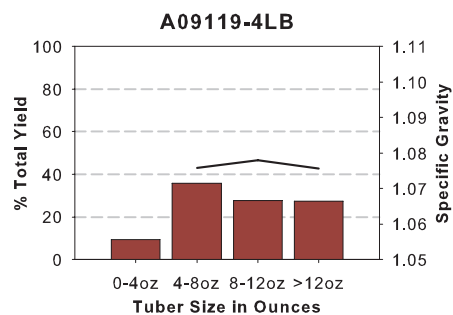
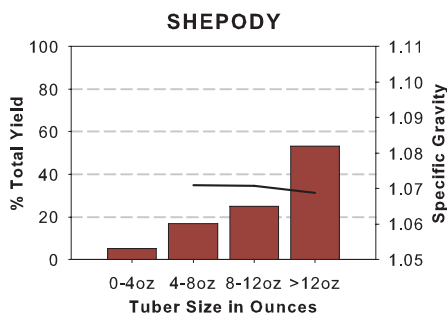
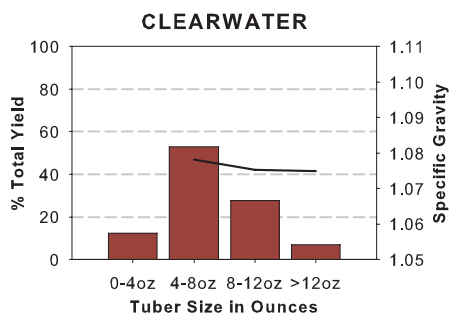
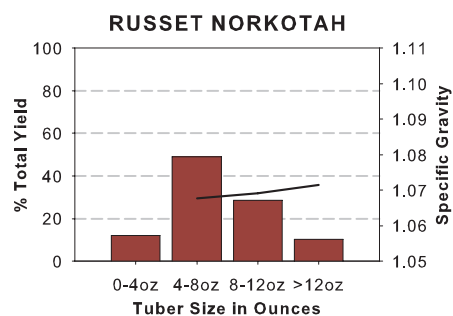
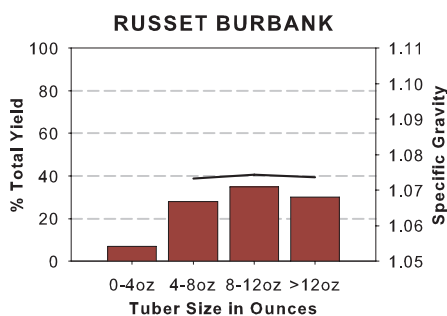
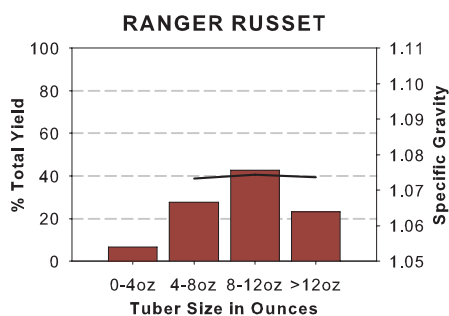
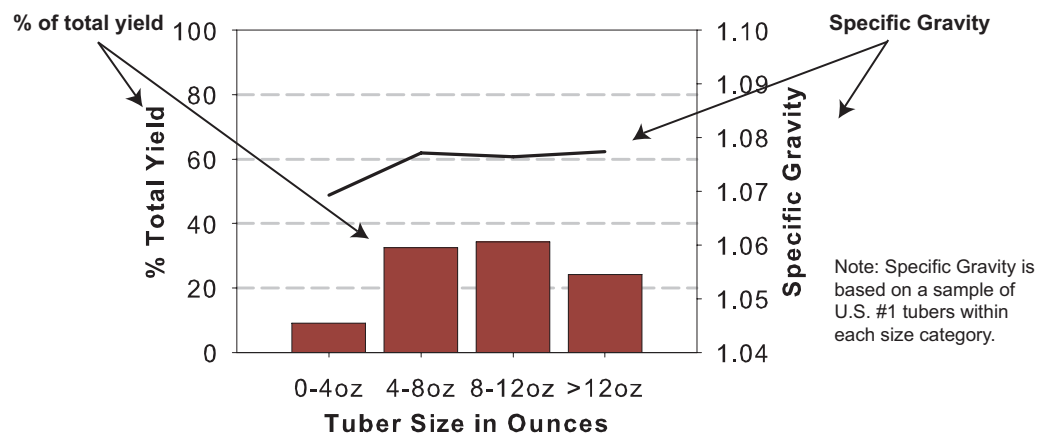
ENTRY	30 DAY	50 DAY	TUBER	STEMS PER	AVERAGE TUBER		SKIN	TUBER	BRUISE (%)	
	STAND	STAND	GREENING	PLANT	WEIGHT	NUMBER	SET	SHAPE	(8-12 oz tubers)	
	% Emerged	% Emerged	% Total Yield	Above Ground	Ounces	Tubers/Plant	1 = Poor 5 = Good	1 = Round 5 = Long	BLACKSPOT	SHATTER
Ranger Russet	11	96	2	1.9	7.9	7.8	5	4	23	13
Russet Burbank	31	98	2	2.0	7.9	8.4	3	4	13	7
Russet Norkotah	0	100	0	2.4	6.0	9.0	4	4	3	7
Clearwater Russet	0	98	2	2.4	5.9	10.0	2	4	0	0
Shepody	4	98	2	2.0	9.8	6.8	4	4	0	20
A09119-4LB	0	96	2	1.9	7.2	7.8	3	2	5	60
A10594-4sto	0	100	1	1.3	7.6	6.6	4	3	0	25
A11188-1	0	82	0	1.4	11.5	5.6	4	3	0	30
A11271-2TE	0	96	0	2.2	6.6	7.8	3	2	0	0
A12305-2adg	0	96	1	2.0	6.5	10.2	3	3	0	30
AFA5661-8	0	84	1	1.9	6.7	7.3	4	3	5	10
AOR11217-3	0	91	1	2.2	7.2	8.7	3	4	0	10
COA11013-2	24	98	1	2.3	6.4	11.7	4	4	0	7

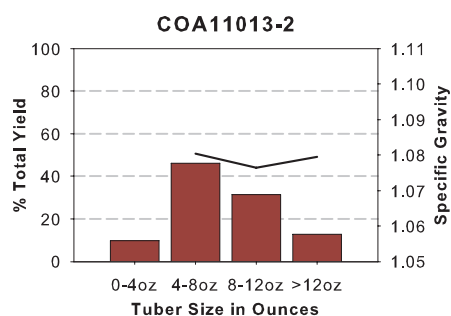
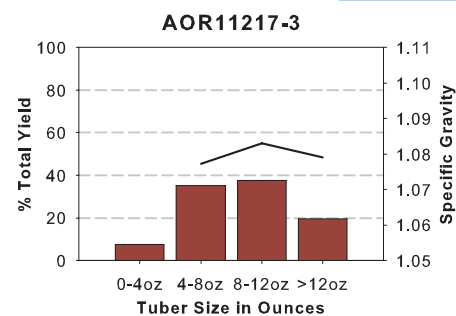
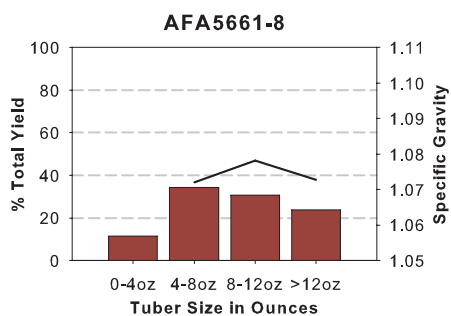
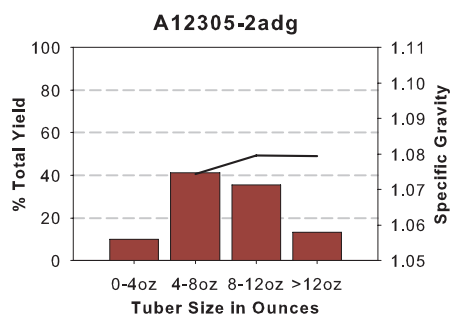
* Percent values may not total 100% due to rounding

2020 Early Harvest Tri-State Trial

Tuber Yield and Specific Gravity Distributions

12 inch In-Row Spacing





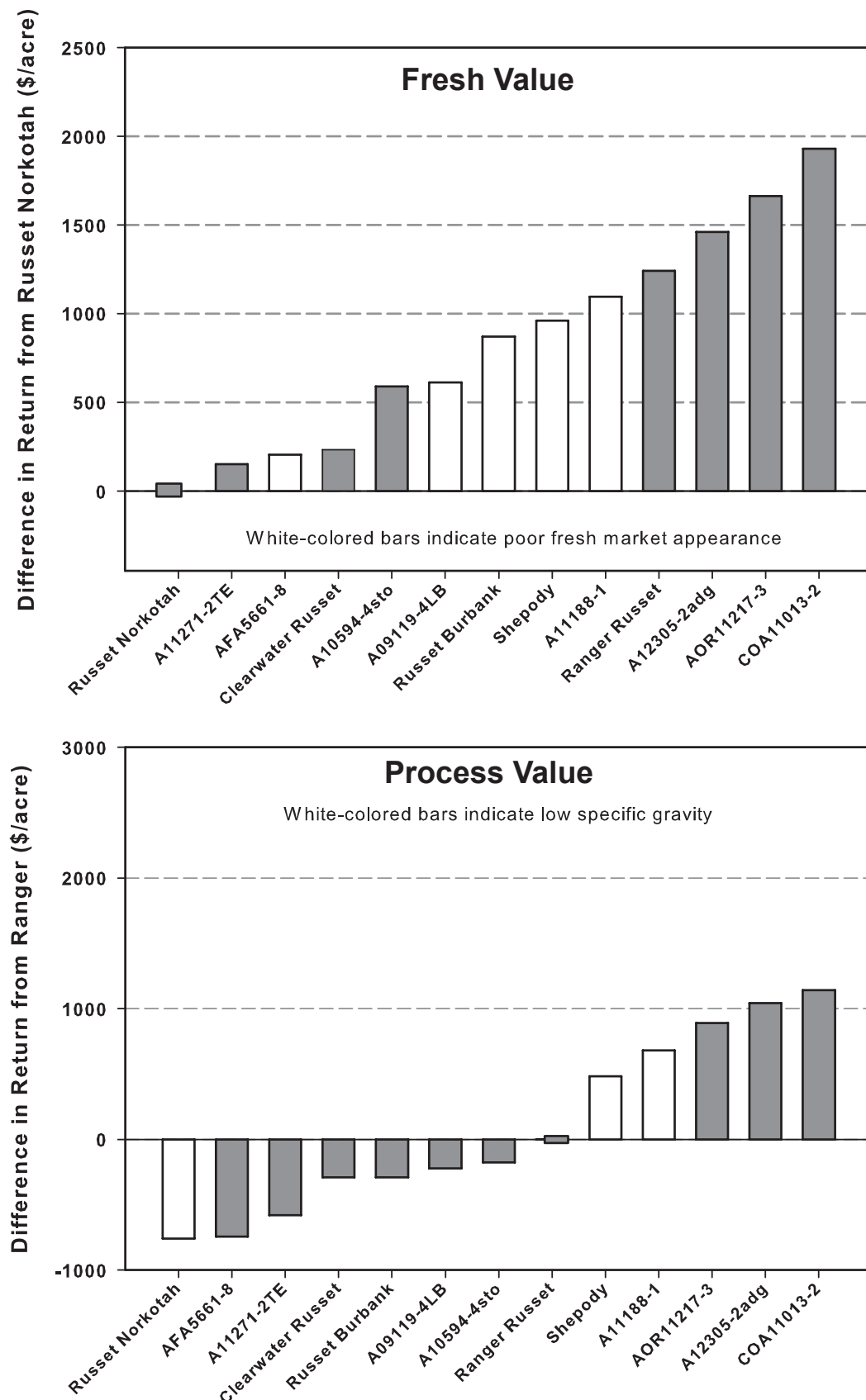


Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry.

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.

2020 Early Harvest Tri-State Trial

Tubers

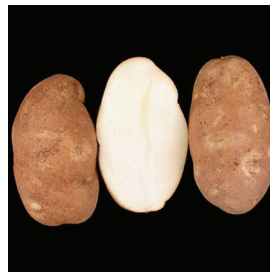
Ranger Russet



Russet Burbank



Russet Norkotah



Clearwater Russet



A09119-4LB



A10594-4sto



A11188-1



Shepody



A12305-2adg



AFA5661-8



AOR11217-3



COA11013-2



2020 Late Harvest Tri-State Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 1

Vine Kill Date: September 2

Harvest Date: September 15

Days Grown: 154

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 book.

Fresh Market Standout(s): AOR11217-3

Process Market Standout(s): AOR11217-3, A12305-2adg, and AFA5661-8

Yield and Economic Data

➤ **Total and US #1**

Highest: Ranger Russet had the highest total yield (1060 CWT/A) and Clearwater Russet had the highest US#1 yield (909 CWT/A). COA11013-2 had the second highest total yield (1048 CWT/A). Clearwater Russet had the third highest total yield (1046 CWT/A).

Lowest: A11188-1 had the lowest total yield (842 CWT/A) and Russet Norkotah had the second lowest total yield (844 CWT/A). A09119-4LB had the lowest US#1 yield (656 CWT/A).

➤ **% U.S. #1's Greater Than 4 oz.**

Highest: Clearwater Russet (87%), A10594-4sto (86%).

Lowest: Ranger Russet (70%) and A09119-4LB (71%).

➤ **Carton Yield (100 to 50 Count (7 to 18 oz US #1 Tubers))**

Highest: Clearwater Russet (31.2 Tons/A), A12305-2adg (30.8 Tons/A).

Lowest: A11188-1 (10.1 Tons/A) and A09119-4LB (19.5 Tons/A).

➤ **Gross Return (\$/acre)**

Fresh Market Highest: Clearwater Russet, A12305-2adg, and AOR11217-3.

Fresh Market Lowest: A11188-1, A09119-4LB, and AFA5661-8.

Process Market Highest: Clearwater Russet and AOR11217-3.

Process Market Lowest: Russet Norkotah, A09119-4LB, and A10594-4sto.

2020 Late Harvest Tri-State Trial

Postharvest Information

Samples were obtained from the Washington, Idaho and Oregon field adaptation trials for analysis in Pullman. Eight numbered entries and three cultivars were tested from ID, WA and OR. Postharvest performance ratings of the clones compared with Russet Burbank 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: AOR11217-3*, A10594-4sto

Lowest scoring clones: A11188-1, RB*, A12305-2adg

➤ Low Temperature Sweetening

Most resistant: A11271-2TE, COA11013-2, Clearwater

Most susceptible: A12305-2adg, RB*, A11188-1

➤ French Fry Taste Panel

Highest rated: A11271-2TE, A10594-4sto, Clearwater

Lowest rated: A11188-1, RB*

➤ Blackspot Bruise Susceptibility

Most resistant: COA11013-2*, AOR11217-3

Most susceptible: RR*, A10594-4sto, A11188-1

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

Lowest L/W: AFA5661-8, A11188-1, A11271-2TE, A09119-4LB

Highest L/W: RR*, RB*, COA11013-2*, A12305-2adg

Least variable: COA11013-2*

Most variable: AFA5661-8

Details

- AOR11217-3* and A10594-4sto were the highest rated entries, scoring 28.7 and 28.3 out of 38 points, respectively.
- A11271-2TE, COA11013-2, and Clearwater were resistant to cold sweetening, with tuber samples from all states producing acceptably light colored fries following storage for 60 d at 44 or 40°F (USDA 0 at 44°F, USDA 1 at 40°F, average of stem ends).
- In contrast to last year's trial, most entries maintained uniform fry color (bud to stem end photovolt difference <9) following storage for 60 days regardless of production site and storage temperature (48, 44, 40°F).
- Retention of process quality during storage of RB, A11188-1, and A09119-4LB 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 COA11013-2* and AOR11217-3 following 60 days at 44°F.
- A11188-1, RB*, and A12305-2adg received the lowest overall postharvest scores. A11188-1 tubers stored at 44 and 40°F for 60 days (and reconditioned at 60°F) displayed an apparent physiological disorder characterized by the development of large areas of brown to black discoloration in the fresh cut tubers.

- RB*, A11188-1, and A12305-2adg received the lowest overall postharvest scores. A11188-1 tubers stored at 44 and 40°F for 60 days (and reconditioned at 60°F) displayed an apparent physiological disorder characterized by the development of large areas of brown to black discoloration in the fresh cut tubers.
- Average (across states) gravities of A11188-1, COA11013-2*, RB, and A11271-2TE were 1.070, 1.075, 1.075, and 1.076, respectively; too low for frozen process contracts. The gravities of the other entries ranged from 1.079 to 1.086 when averaged across states. When averaged across the eleven entries, gravities were 1.073 (OR), 1.086 (ID), and 1.077 (WA).
- A11271-2TE, A10594-4sto, and Clearwater were the favorites in the taste panels, scoring 3.7/5 on average across growing locations (5 is best). A11188-1 and RB* received the lowest taste panel score of 2.5 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). RR*, A10594-4sto, and A11188-1 were the most susceptible, scoring 92, 89 and 81% bruise (stem end), respectively, in the controlled impact study. These entries also had the highest bruise severity, averaging 3.6/5. COA11013-2* and AOR11217-3 were the most resistant, averaging 14 and 26% bruise (stem end), respectively, and 1.2 severity rating.
- The 8- to 10-oz tubers of AFA5661-8, A11188-1, A11271-2TE, and A09119-4LB had the lowest length to width ratios (avg. L/W=1.55 across states), which was lower than the average of 1.71 for the roundest entries in last year's trial. The range in L/W ratios was 1.46 (AFA5661-8 from OR) to 2.36 (RR from ID). Averaged across states, yields of 3-inch or longer French fries ranged from 83 to 92% by tuber fresh weight. AFA5661-8 had the greatest variation in L/W ratio; usable fry yields ranged from 80 to 87% across production sites.
- Reconditioning (60°F, 21 days) tubers of A11188-1, A10594-4sto, and RR* 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 A11271-2TE, Clearwater, and COA11013-2 changed little in response to reconditioning. AFA5661-8, COA11013-2, and Clearwater appeared more susceptible to sugar end development based on attenuated reconditioning of the stem versus bud end of tubers following storage at 40°F.
- Following 60 days at 48°F, 96% of COA11013-2* tubers were sprouting with an average sprout length of 2.1 inches. On average, 80% of tubers of A11271-2TE and A10594-4sto had sprout lengths of 0.63 inches and 58% of tubers of AOR11217-3 had sprout lengths of 0.54 inches. This compares with 71% of RR tubers with 0.29-inch-long sprouts and no sprouting from RB* and A12305-2adg tubers.

Overall Tri-State Postharvest Merit Scores

Clone	Postharvest Merit Scores			3 state Average
	WA	ID	OR	
10 AOR11217-3	3.4	4.1	3.8	3.8
5 A10594-4sto	3.3	4.4	3.5	3.7
7 A11271-2TE	3.1	4.5	3.3	3.6
11 COA11013-2	3.1	4.1	3.5	3.6
3 Clearwater	2.4	4.4	3.9	3.6
1 Ranger Russet	2.8	4.0	3.3	3.4
9 AFA5661-8	2.7	3.3	3.9	3.3
4 A09119-4LB	2.9	3.8	2.9	3.2
8 A12305-2adg	2.4	3.6	3.1	3.0
2 Russet Burbank	1.8	2.7	2.7	2.4
6 A11188-1	1.8	2.4	1.3	1.8

2020 Late 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	> 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
Ranger Russet	1060	A	53.0	70	18	12	37	19.6	84	44.6
Russet Burbank	931	AB	46.6	74	12	14	45	21.1	77	36.0
Russet Norkotah	844	B	42.2	84	5	11	56	23.7	78	33.1
Clearwater Russet	1046	A	52.3	87	2	11	60	31.2	82	42.7
A09119-4LB	930	AB	46.5	71	10	19	42	19.5	76	35.2
A10594-4sto	842	B	42.1	86	5	9	57	24.1	87	36.7
A11188-1	926	AB	46.3	76	12	12	22	10.1	87	40.0
A11271-2TE	948	AB	47.4	79	8	13	59	28.1	82	38.5
A12305-2adg	1020	A	51.0	82	7	11	60	30.8	83	42.3
AFA5661-8	983	AB	49.2	83	5	12	42	20.8	85	41.6
AOR11217-3	1012	A	50.6	84	8	8	60	30.3	85	43.1
COA11013-2	1048	A	52.4	77	9	14	50	26.0	72	37.5

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
Ranger Russet	743	BCDEF	37.1	9	32	59	1.079	0	0	0
Russet Burbank	689	EF	34.4	18	47	36	1.075	0	7	0
Russet Norkotah	713	DEF	35.6	19	47	34	1.068	0	0	0
Clearwater Russet	909	A	45.5	15	49	36	1.081	0	0	3
A09119-4LB	656	F	32.8	10	38	52	1.074	0	0	3
A10594-4sto	726	CDEF	36.3	8	41	51	1.081	3	23	0
A11188-1	698	DEF	34.9	3	18	78	1.065	0	0	0
A11271-2TE	744	BCDEF	37.2	10	52	37	1.077	0	0	3
A12305-2adg	837	ABC	41.8	11	50	39	1.080	0	0	0
AFA5661-8	812	ABCDE	40.6	7	34	59	1.085	0	3	0
AOR11217-3	856	AB	42.8	15	48	37	1.083	0	0	13
COA11013-2	813	ABCD	40.6	29	57	14	1.075	0	0	20

ENTRY	40 DAY STAND	60 DAY STAND	STEMS PER PLANT	TUBER GREENING	AVERAGE TUBER		SKIN SET	TUBER SHAPE	BRUISE (%)	
	% Emerged	% Emerged	Above Ground	% Total Yield	Weight	Number	1 = Poor 5 = Good	1 = Round 5 = Long	(8-12 oz tubers)	
					Ounces	Tubers/Plant			BLACKSPOT	SHATTER
Ranger Russet	38	89	2.5	6	11.8	8.1	3	4	0	70
Russet Burbank	14	88	2.6	4	9.1	9.2	3	3	20	87
Russet Norkotah	21	96	3.1	4	8.6	8.8	4	4	5	50
Clearwater Russet	7	90	2.3	5	9.2	10.2	3	3	0	85
A09119-4LB	3	81	2.8	7	10.2	8.2	3	3	0	95
A10594-4sto	0	76	1.8	6	11.2	6.8	4	3	8	60
A11188-1	0	38	2.0	8	16.5	5.0	4	3	18	76
A11271-2TE	0	81	2.0	9	10.1	8.4	3	3	17	57
A12305-2adg	0	64	2.9	3	9.3	9.9	3	3	0	78
AFA5661-8	0	64	2.3	5	11.7	7.5	4	3	11	76
AOR11217-3	11	94	2.6	2	9.2	9.9	3	3	3	95
COA11013-2	18	93	2.6	4	6.9	13.6	4	3	3	83

* Percent values may not total 100% due to rounding

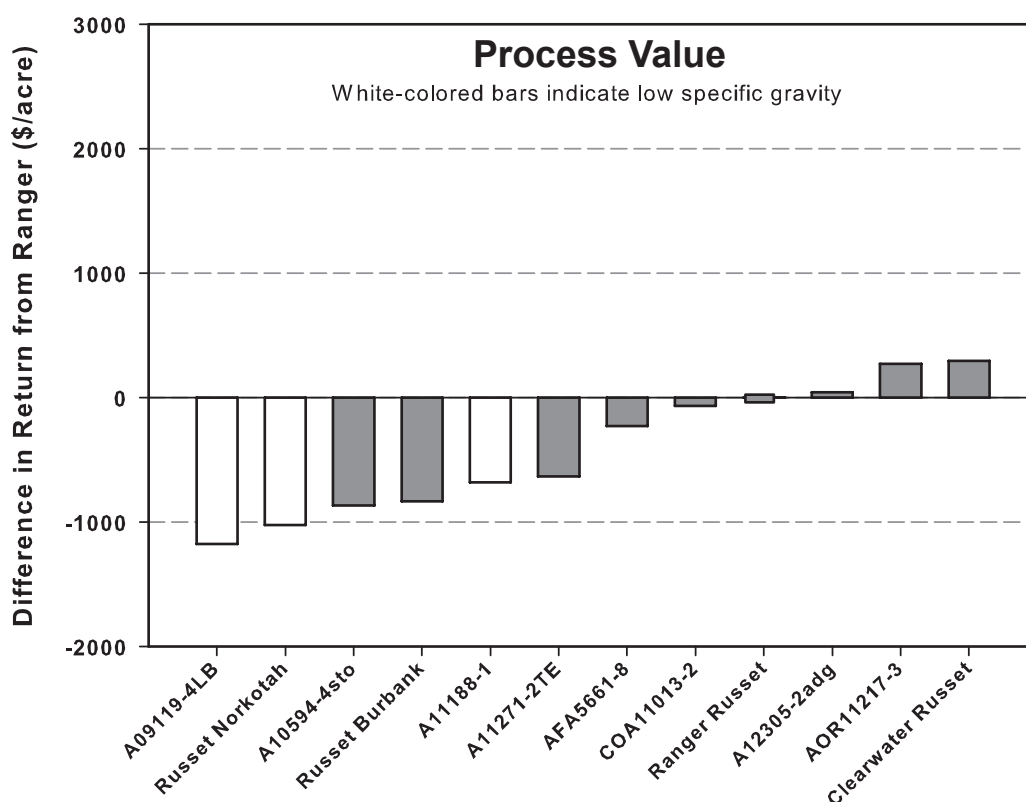
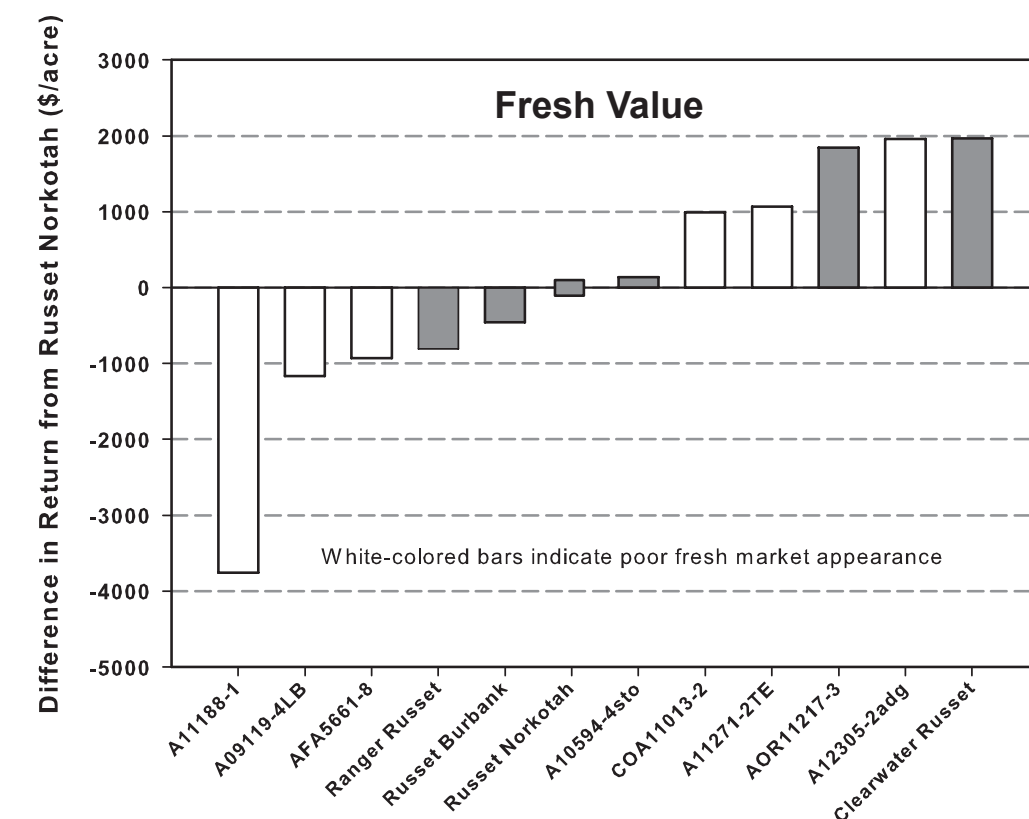
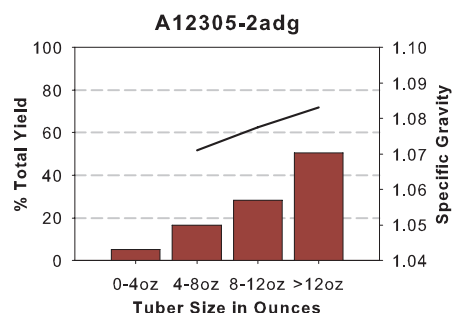
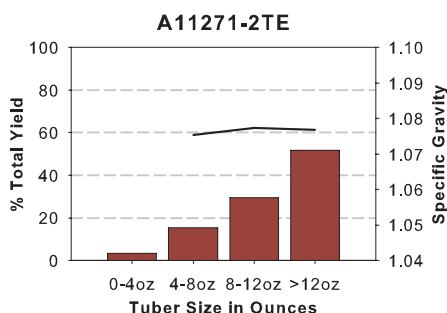
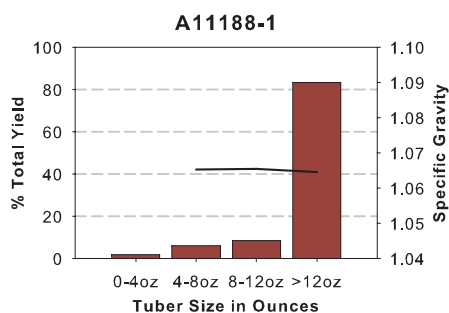
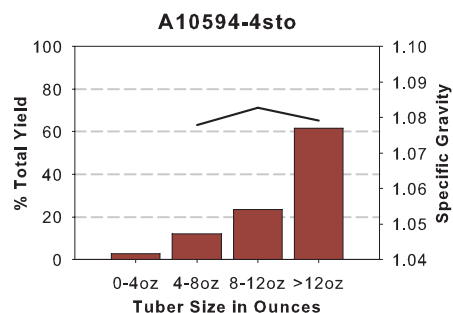
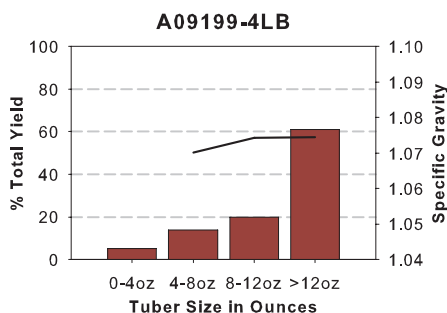
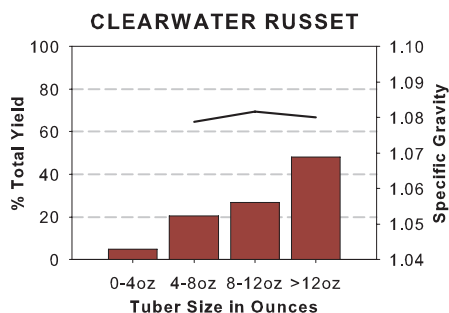
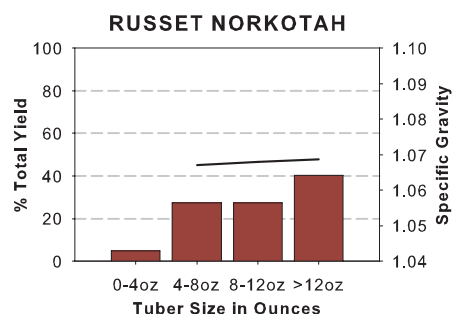
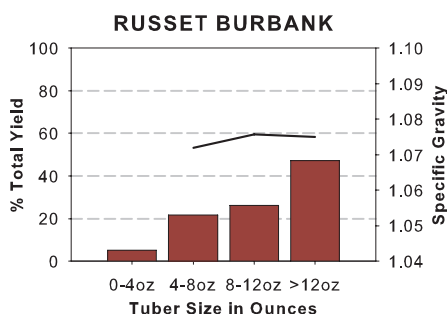
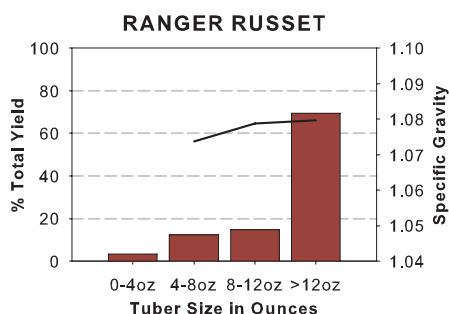
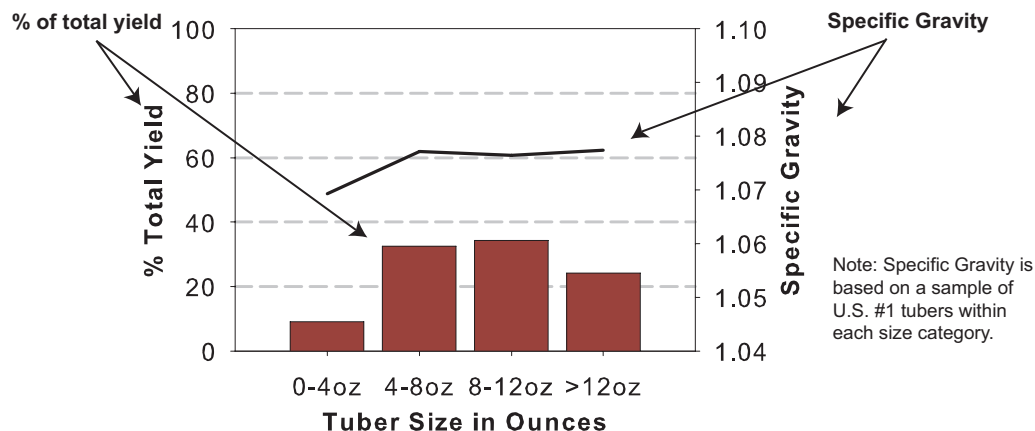


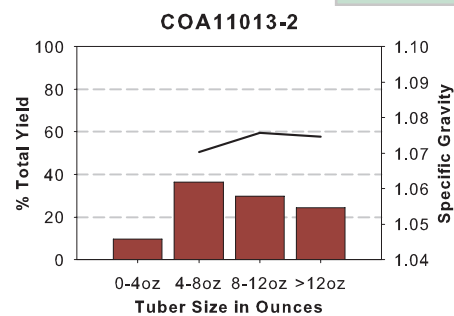
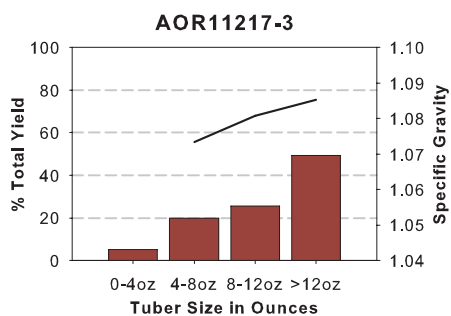
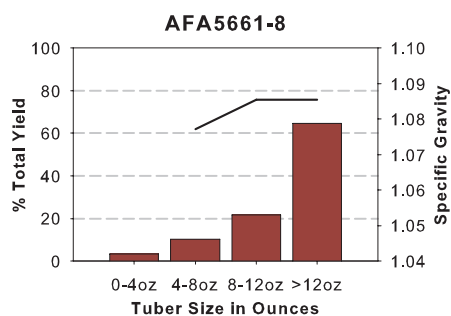
Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to undesirable shape or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

2020 Late Harvest Tri-State Trial

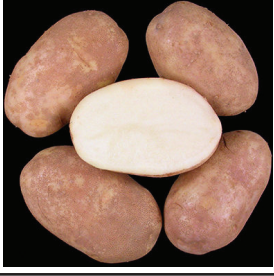
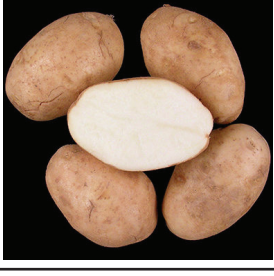
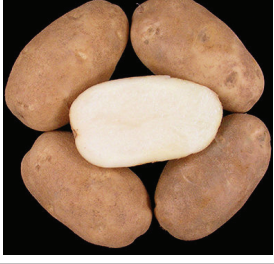
Tuber Yield and Specific Gravity Distributions

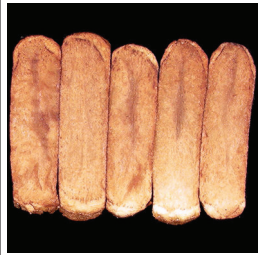
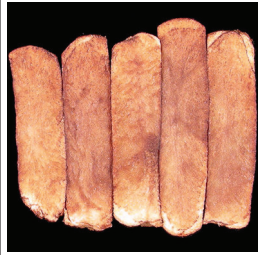
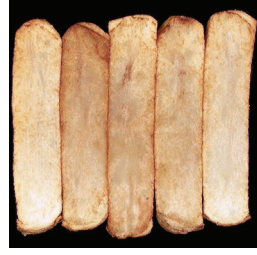
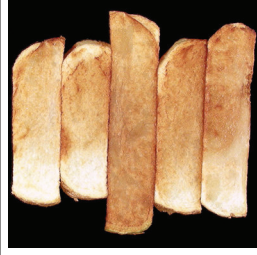
11 inch In-Row Spacing

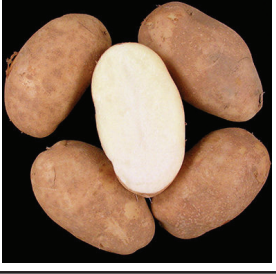
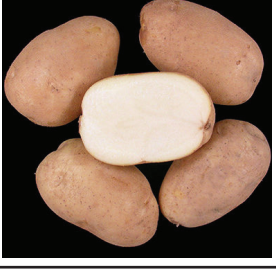
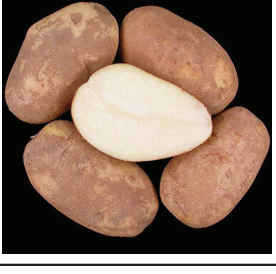


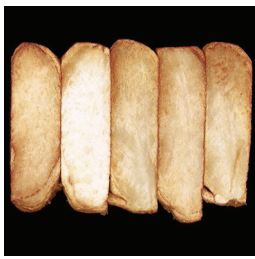
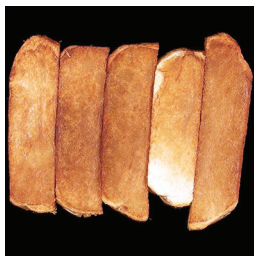
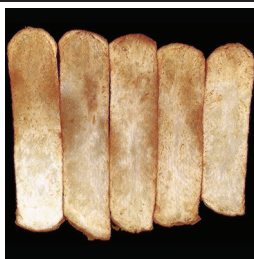
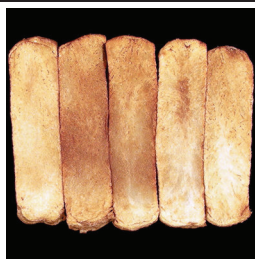
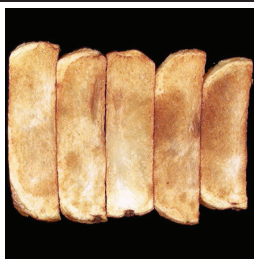
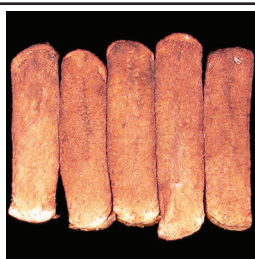
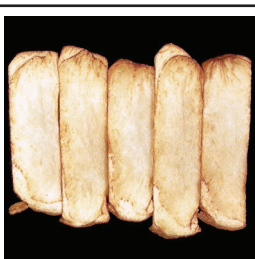
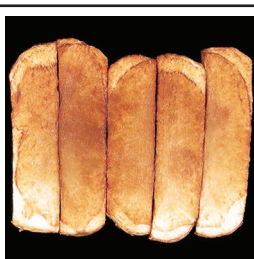
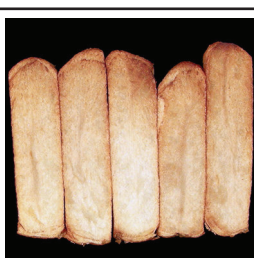
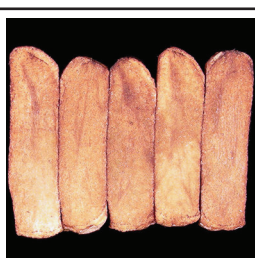
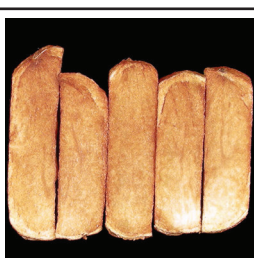


Planting trials in early spring.

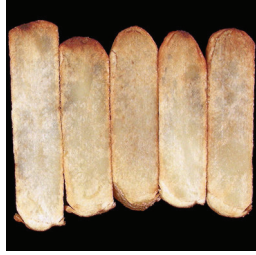
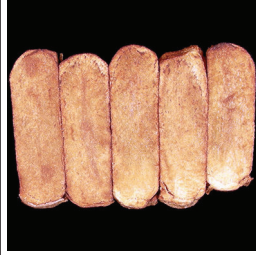
Tubers	WA Late Harvest Tri-State Trial Comments
Ranger Russet	
	Tubers: Fair skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = light uniform; 40°F = relatively dark uniform; Reconditioned = relatively dark non-uniform.
Russet Burbank	
	Tubers: Fair skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = relatively dark non-uniform; 44°F = relatively dark uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.
Clearwater Russet	
	Tubers: Fair skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = relatively dark non-uniform; 44°F = light non-uniform; 40°F = relatively dark non-uniform; Reconditioned = light non-uniform.
A09119-4LB	
	Tubers: Fair skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = light uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.
A10594-4sto	
	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 non-uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Recon.
Ranger Russet				
				
Russet Burbank				
				
Clearwater Russet				
				
A09119-4LB				
				
A10594-4sto				
				

Tubers	WA Late Harvest Tri-State Trial Comments
A11188-1	
	Tubers: Good skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = relatively dark uniform; 44°F = relatively dark uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.
A11271-2TE	
	Tubers: Fair skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = light uniform; 40°F = relatively dark uniform; Reconditioned = relatively dark uniform.
A12305-2adg	
	Tubers: Fair skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light non-uniform; 44°F = relatively dark non-uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark non-uniform.
AFA5661-8	
	Tubers: Good skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = relatively dark uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.
AOR11217-3	
	Tubers: Fair skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = light uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Recon.
A11188-1				
				
A11271-2TE				
				
A12305-2adg				
				
AFA5661-8				
				
AOR11217-3				
				

Tubers	WA Late Harvest Tri-State Trial Comments
COA11013-2	
	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 = relatively dark uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Recon.
COA11013-2				
				

2020 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 §§	
10 AOR11217-3	26.0	40°F	31.5		28.6	SG	28.7
5 A10594-4sto	24.8		33.4		26.8	SG	28.3
7 A11271-2TE	23.6	SG	33.9		25.0	SG	27.5
11 COA11013-2	23.7		31.2		26.9	SG	27.3
3 Clearwater	18.3		33.6		29.8		27.2
1 Ranger Russet	21.1		30.4		25.1	SG	25.5
9 AFA5661-8	20.6	40°F	25.3		29.5		25.1
4 A09119-4LB	21.8	40°F	28.8		22.3	SG	24.3
8 A12305-2adg	18.2	40°F	27.3	40°F	23.8	SG	23.1
2 Russet Burbank	13.9	40°F	20.7	40°F	20.5	SG, 40°F	18.4
6 A11188-1	13.3	SG, 40°F	18.6	48°F	9.8	SG, 44,40°F	13.9
	20.5		28.6		24.4		24.5

§ maximum rating possible = 38

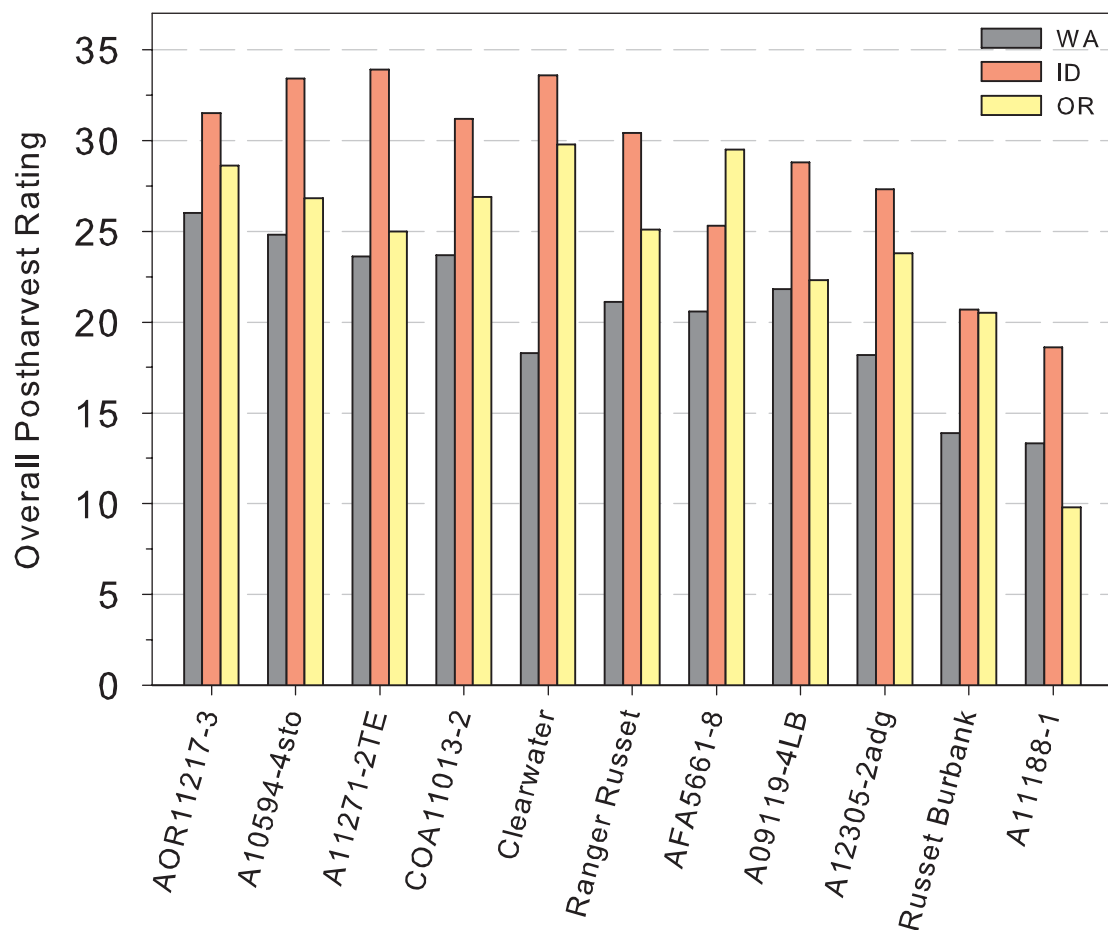
§§ Values for the indicated evaluation are lower than the rejection level.



Layout of the 2020 WSU Direction of Planting Field Trial in April.

2020 Late Harvest Tri-State Trial

Late Harvest Tri-State Postharvest Ratings



2020 Late Harvest Tri-State Trial

Entries Retained from the 2019 Trials Currently in the Tri-State Trial

Harvested fall of 2019

Held at 48° F until December 13, 2019

Stored at 44° F until analysis

Two clones were retained from the 2019 Tri-State Trial into the 2020 Trial (AOR11217-3 & COA11013-2). When averaged across state, AOR11217-3 produced the lightest fries (46.2 ref units). The uniformity of fry color was unacceptable for RB for all three states. Spout lengths of AOR11217-3 and COA11013-2 averaged 0.9 and 0.7 inches, respectively, indicating longer dormancy than Russet Burbank (avg = 1.2 inches).

PHOTOVOLT READING		USDA		% REDUCING SUGAR			Sprouting			
Clone	stem	bud	avg	DIFF	COLOR	stem	bud	avg	percent	length (in.)
Washington										
1 Ranger Russet	26.9	36.6	31.8	9.8	1	1.7	0.9	1.3	100	1.0
2 Russet Burbank	24.1	37.8	30.9	13.7	2	2.1	0.8	1.5	100	1.5
3 AOR11217-3	44.2	45.5	44.9	2.9	0	0.6	0.6	0.6	100	0.8
4 COA11013-2	36.9	42.7	39.8	5.8	0	0.9	0.6	0.8	100	0.5
Average	33.0	LSD 0.05 40.7	3.4 36.8	4.2 8.1	0.8	1.3	0.7	1.0	100	
Idaho										
1 Ranger Russet	34.5	42.4	38.4	8.4	0	1.0	0.6	0.8	100	2.0
2 Russet Burbank	30.0	42.3	36.1	12.3	1	1.4	0.6	1.0	100	1.0
3 AOR11217-3	48.5	47.4	47.9	2.9	0	0.5	0.5	0.5	100	1.5
4 COA11013-2	44.0	46.4	45.2	3.3	0	0.6	0.5	0.6	100	1.0
Average	39.3	LSD 0.05 44.6	2.4 41.9	4.2	0.3	0.9	0.6	0.7	100	
Oregon										
1 Ranger Russet	32.8	33.3	33.0	7.0	0	1.1	1.1	1.1	100	1.0
2 Russet Burbank	26.8	37.1	32.0	10.3	1	1.7	0.9	1.3	100	1.0
3 AOR11217-3	45.5	45.9	45.7	3.6	0	0.6	0.5	0.6	100	0.5
4 COA11013-2	38.8	39.8	39.3	4.0	0	0.8	0.7	0.8	100	0.5
Average	36.0	LSD 0.05 39.0	3.7 37.5	2.8 6.2	0.3	1.1	0.8	0.9	100	

Date test performed:

Washington April 27

Idaho April 27

Oregon April 27

2020 Late Harvest Tri-State Trial Prior to Storage

PHOTOVOLT READING						USDA	SPECIFIC	
Clone	stem	bud	av	rtg §	DIFF	COLOR	GRAVITY	rtg
Washington								
1 Ranger Russet	32.7	37.2	34.9	3+	4.7	0	1.077	1
2 Russet Burbank	31.2	37.8	34.5	3+	6.8	0	1.076	1
3 Clearwater	35.6	39.4	37.5	4+	5.0	0	1.080	3
4 A09119-4LB	48.2	44.9	46.5	5+	5.1	0	1.076	1
5 A10594-4sto	40.4	35.7	38.0	4+	5.6	0	1.078	2
6 A11188-1	31.4	33.4	32.4	3+	3.9	0	1.067	0
7 A11271-2TE	41.2	40.2	40.7	5+	2.9	0	1.074	0
8 A12305-2adg	39.8	44.0	41.9	5+	4.9	0	1.079	2
9 AFA5661-8	36.9	35.3	36.1	4+	2.6	0	1.081	4
10 AOR11217-3	39.6	43.9	41.7	5+	6.0	0	1.081	4
11 COA11013-2	34.5	38.0	36.2	4+	4.5	0	1.076	1
Average		LSD 0.05	2.6		2.7			0.006
	37.4	39.1	38.2		4.7	0		1.077
Idaho								
1 Ranger Russet	41.7	40.4	41.0	5+	2.8	0	1.089	4
2 Russet Burbank	28.7	39.8	34.2	3-	11.7	1	1.078	2
3 Clearwater	42.3	41.0	41.6	5+	4.2	0	1.087	5
4 A09119-4LB	50.0	45.1	47.6	5+	5.1	0	1.094	2
5 A10594-4sto	46.4	38.3	42.3	5+	8.3	0	1.086	5
6 A11188-1	35.6	33.2	34.4	3+	3.7	0	1.081	4
7 A11271-2TE	48.4	40.9	44.6	5+	7.5	0	1.085	5
8 A12305-2adg	47.2	47.0	47.1	5+	3.0	0	1.090	4
9 AFA5661-8	37.4	35.3	36.3	4+	4.6	0	1.095	2
10 AOR11217-3	48.9	48.2	48.6	5+	2.3	0	1.084	5
11 COA11013-2	41.3	42.5	41.9	5+	4.3	0	1.082	4
Average		LSD 0.05	2.2		2.8			0.004
	42.5	41.1	41.8		5.2	0		1.086
Oregon								
1 Ranger Russet	46.3	42.9	44.6	5+	4.9	0	1.072	0
2 Russet Burbank	40.7	40.6	40.7	5+	4.8	0	1.072	0
3 Clearwater	51.1	49.1	50.1	5+	3.9	0	1.076	1
4 A09119-4LB	50.7	44.0	47.3	5+	6.7	0	1.074	0
5 A10594-4sto	45.1	43.6	44.4	5+	3.0	0	1.075	0
6 A11188-1	28.4	30.4	29.4	2+	5.7	1	1.064	0
7 A11271-2TE	48.0	41.9	44.9	5+	6.1	0	1.069	0
8 A12305-2adg	50.5	49.9	50.2	5+	3.7	0	1.075	0
9 AFA5661-8	48.5	46.1	47.3	5+	3.5	0	1.082	4
10 AOR11217-3	51.7	48.8	50.3	5+	3.5	0	1.072	0
11 COA11013-2	45.0	41.0	43.0	5+	5.2	0	1.068	0
Average	45.0	LSD 0.05	2.3		2.5			0.004
	46.0	43.5	44.7		4.6	0		1.073

Date test performed:

Washington**Idaho****Oregon**

Sept. 23

Sept. 25

Oct. 1

Sept. 22

Sept. 24

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.

2020 Late Harvest Tri-State Trial

Stored at 48°F after Arrival

FRENCH FRY		BRUISE POTENTIAL				SOFT ROT INDEX	
TASTE PANEL		(percent)		[color 5=darkest]		(percent)	
Clone	rating	stem	bud	stem	bud	stem	bud
Washington							
1 Ranger Russet	3.1	92	0	4.5	1.0	16	16
2 Russet Burbank	2.9	88	13	3.7	1.3	16	19
3 Clearwater	3.3	38	25	1.8	1.5	13	20
4 A09119-4LB	2.8	58	8	2.3	1.2	10	14
5 A10594-4sto	3.8	92	0	3.5	1.0	13	12
6 A11188-1	2.3	100	8	3.7	1.2	18	21
7 A11271-2TE	3.6	71	4	2.6	1.1	12	13
8 A12305-2adg	3.2	33	13	1.7	1.3	13	17
9 AFA5661-8	2.6	79	4	3.2	1.1	9	11
10 AOR11217-3	3.0	29	4	1.6	1.1	9	12
11 COA11013-2	2.7	17	13	1.4	1.3	14	17
LSD 0.05	0.5	27	16			3	5
Average	3.0	63.3	8.3	2.7	1.2	12.9	15.7
Idaho							
1 Ranger Russet	3.4	92	17	3.7	1.3	11	19
2 Russet Burbank	2.7	58	0	2.3	1.0	13	15
3 Clearwater	3.6	50	17	2.1	1.3	9	10
4 A09119-4LB	3.8	63	0	2.6	1.0	10	13
5 A10594-4sto	3.4	88	13	3.2	1.3	10	12
6 A11188-1	2.6	100	83	4.3	3.2	15	13
7 A11271-2TE	3.9	63	4	2.5	1.1	11	14
8 A12305-2adg	3.3	38	4	2.0	1.1	13	20
9 AFA5661-8	3.3	100	25	3.9	1.5	9	9
10 AOR11217-3	3.5	42	13	1.9	1.3	11	16
11 COA11013-2	3.2	25	0	1.5	1.0	13	15
LSD 0.05	0.5	29	19			4	3
Average	3.3	65.2	15.9	2.7	1.4	11.4	14.2
Oregon							
1 Ranger Russet	3.1	92	13	3.7	1.3	11	12
2 Russet Burbank	2.5	50	4	2.5	1.1	11	15
3 Clearwater	3.8	4	13	1.1	1.3	11	14
4 A09119-4LB	3.3	4	4	1.1	1.1	8	10
5 A10594-4sto	3.8	88	0	3.6	1.0	11	10
6 A11188-1	1.8	42	4	1.9	1.1	15	12
7 A11271-2TE	4.0	17	0	1.3	1.0	10	16
8 A12305-2adg	3.8	17	0	1.3	1.0	10	15
9 AFA5661-8	3.5	54	0	2.4	1.0	10	9
10 AOR11217-3	3.6	8	13	1.2	1.3	11	10
11 COA11013-2	2.9	0	0	1.0	1.0	10	11
LSD 0.05	0.5	25	ns			4	4
Average	3.3	34.1	4.5	1.9	1.1	10.7	12.2

Date test performed:

Washington

Oct. 12

Oct. 6

Nov. 3

Idaho

Oct. 13

Oct. 8

Nov. 10

Oregon

Oct. 14

Oct. 23

Nov. 17

2020 Late Harvest Tri-State Trial

Stored at 48°F for 60 Days

PHOTOVOLT READING					DIFF	USDA	% REDUCING SUGAR		SPROUTING	
Clone	stem	bud	average	rtg §		COLOR	stem	bud	(%)	length (in)
Washington										
1 Ranger Russet	32.3	37.8	35.0	3+	5.5	0	1.2	0.8	80	0.25
2 Russet Burbank	19.1	28.7	23.9	1-	9.6	3	2.8	1.5	0	
3 Clearwater	24.9	35.1	30.0	2-	10.2	1	2.0	1.0	27	0.13
4 A09119-4LB	35.7	38.4	37.1	4+	5.7	0	1.0	0.8	20	0.25
5 A10594-4sto	36.0	37.2	36.6	4+	2.6	0	0.9	0.9	67	1.00
6 A11188-1	19.5	24.8	22.1	1+	5.5	2	2.8	2.0	80	0.50
7 A11271-2TE	36.3	38.1	37.2	4+	4.3	0	0.9	0.8	87	0.75
8 A12305-2adg	25.3	39.8	32.5	3-	14.5	1	1.9	0.7	0	
9 AFA5661-8	29.6	34.9	32.2	3+	5.9	1	1.4	1.0	33	0.25
10 AOR11217-3	36.5	42.0	39.2	4+	6.0	0	0.9	0.7	73	0.75
11 COA11013-2	33.7	38.3	36.0	4+	4.8	0	1.1	0.8	87	1.13
Average	LSD 0.05		2.7		3.3				21	
	29.9	35.9	32.9		6.8	1	1.5	1.0	50	
Idaho										
1 Ranger Russet	33.7	38.8	36.3	4+	5.3	0	1.1	0.8	67	0.13
2 Russet Burbank	32.9	38.9	35.9	4+	7.7	0	1.1	0.8	0	
3 Clearwater	44.2	47.9	46.1	5+	5.9	0	0.6	0.5	13	0.13
4 A09119-4LB	49.4	47.3	48.3	5+	3.8	0	0.5	0.5	0	
5 A10594-4sto	44.9	41.6	43.2	5+	3.4	0	0.6	0.7	67	0.13
6 A11188-1	16.6	19.7	18.2	0+	5.4	3	3.3	2.7	0	
7 A11271-2TE	48.3	43.0	45.6	5+	5.3	0	0.5	0.6	67	0.13
8 A12305-2adg	35.2	39.7	37.4	4+	7.2	0	1.0	0.7	0	
9 AFA5661-8	34.4	37.5	35.9	4+	4.8	0	1.0	0.9	20	0.13
10 AOR11217-3	43.5	47.5	45.5	5+	4.0	0	0.6	0.5	7	0.13
11 COA11013-2	43.7	45.4	44.5	5+	2.8	0	0.6	0.6	100	1.25
Average	LSD 0.05		2.6		3.0				20	
	38.8	40.6	39.7		5.1	0	1.0	0.8	31	
Oregon										
1 Ranger Russet	40.5	39.3	39.9	4+	3.6	0	0.7	0.8	67	0.50
2 Russet Burbank	31.4	33.1	32.3	3+	2.8	0	1.3	1.1	0	
3 Clearwater	40.2	42.9	41.5	5+	3.7	0	0.7	0.6	80	0.13
4 A09119-4LB	35.9	36.0	36.0	4+	5.1	0	0.9	0.9	57	0.75
5 A10594-4sto	41.2	40.4	40.8	5+	4.1	0	0.7	0.7	100	0.75
6 A11188-1	19.1	24.2	21.6	1+	5.2	3	2.8	2.1	20	0.13
7 A11271-2TE	47.4	39.8	43.6	5+	7.7	0	0.5	0.7	93	1.00
8 A12305-2adg	38.4	43.2	40.8	5+	5.3	0	0.8	0.6	0	
9 AFA5661-8	49.9	47.1	48.5	5+	3.8	0	0.5	0.5	87	0.50
10 AOR11217-3	45.1	44.9	45.0	5+	3.7	0	0.6	0.6	93	0.75
11 COA11013-2	42.6	39.4	41.0	5+	5.6	0	0.6	0.8	100	4.00
Average	LSD 0.05		3.6		3.2				20	
	39.2	39.1	39.2		4.6	0	0.9	0.9	63	

Date test performed:

Washington

Dec. 3

Dec. 3

Dec. 17

Idaho

Dec. 8

Dec. 8

Dec. 17

Oregon

Dec. 11

Dec. 11

Dec. 17

§ 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 post-harvest rating.

2020 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 Ranger Russet	29.0	36.2	32.6	3+	8.4	1	1.5	0.9
2 Russet Burbank	16.4	24.5	20.4	1+	8.1	3	3.3	2.0
3 Clearwater	25.8	39.7	32.8	3-	13.9	1	1.8	0.7
4 A09119-4LB	30.4	31.6	31.0	3+	6.4	1	1.4	1.2
5 A10594-4sto	30.7	33.2	31.9	3+	4.8	0	1.3	1.1
6 A11188-1	18.8	20.8	19.8	1+	4.9	3	2.9	2.5
7 A11271-2TE	34.9	38.0	36.4	4+	4.7	0	1.0	0.8
8 A12305-2adg	20.8	33.1	27.0	2-	12.3	2	2.5	1.1
9 AFA5661-8	28.8	30.6	29.7	2+	4.4	1	1.5	1.3
10 AOR11217-3	30.5	38.5	34.5	3+	7.9	0	1.3	0.8
11 COA11013-2	30.2	36.8	33.5	3+	6.6	1	1.4	0.9
Average	LSD 0.05		2.8	3.7		1.81.2		
	26.9	33.0	30.0	7.5				
Idaho								
1 Ranger Russet	36.6	39.2	37.9	4+	3.1	0	0.9	0.8
2 Russet Burbank	26.5	35.2	30.8	3+	8.8	1	1.8	1.0
3 Clearwater	39.9	45.7	42.8	5+	6.9	0	0.7	0.6
4 A09119-4LB	44.1	43.9	44.0	5+	4.6	0	0.6	0.6
5 A10594-4sto	42.8	41.1	41.9	5+	3.8	0	0.6	0.7
6 A11188-1	28.9	30.1	29.5	2+	3.5	1	1.5	1.4
7 A11271-2TE	44.3	40.2	42.2	5+	5.8	0	0.6	0.7
8 A12305-2adg	28.8	36.4	32.6	3+	8.0	1	1.5	0.9
9 AFA5661-8	33.4	38.6	36.0	4+	5.2	0	1.1	0.8
10 AOR11217-3	37.9	42.1	40.0	4+	5.9	0	0.8	0.7
11 COA11013-2	38.1	41.3	39.7	4+	7.0	0	0.8	0.7
Average	LSD 0.05		2.9	3.4		1.00.8		
	36.5	39.4	37.9	5.7				
Oregon								
1 Ranger Russet	36.1	39.7	37.9	4+	5.6	0	0.9	0.7
2 Russet Burbank	26.6	32.5	29.6	2+	6.4	1	1.8	1.2
3 Clearwater	43.8	43.6	43.7	5+	3.7	0	0.6	0.6
4 A09119-4LB	37.6	34.4	36.0	4+	6.7	0	0.8	1.0
5 A10594-4sto	37.9	38.6	38.2	4+	4.2	0	0.8	0.8
6 A11188-1	15.0	19.2	17.1	0+	5.4	3	3.6	2.8
7 A11271-2TE	46.2	38.4	42.3	5-	11.1	0	0.5	0.8
8 A12305-2adg	31.4	39.3	35.3	3-	13.0	0	1.3	0.8
9 AFA5661-8	43.7	45.1	44.4	5+	7.1	0	0.6	0.6
10 AOR11217-3	42.1	43.1	42.6	5+	2.8	0	0.6	0.6
11 COA11013-2	40.9	37.8	39.3	4+	6.6	0	0.7	0.8
Average			4.2	4.8		1.11.0		
	36.5	37.4	37.0	6.6				

Date test performed:

Washington

Dec. 4

Dec. 4

Idaho

Dec. 9

Dec. 9

Oregon

Dec. 12

Dec. 12

§ 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.

2020 Late Harvest Tri-State 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 Ranger Russet	0	15.3	24.0	19.7	1	8.6	3	21.3	33.3	27.3	12.5	2
2 Russet Burbank	0	9.9	13.2	11.5	0	3.3	4	18.2	24.5	21.3	6.3	3
3 Clearwater	0	18.1	28.8	23.5	1	10.7	3	26.7	43.0	34.8	16.3	1
4 A09119-4LB	0	13.8	15.7	14.8	0	3.2	4	17.0	23.3	20.1	6.3	3
5 A10594-4sto	0	17.4	23.7	20.6	1	6.3	3	28.5	36.8	32.7	10.6	1
6 A11188-1	0	9.3	12.9	11.1	0	3.9	4	21.6	21.2	21.4	4.8	2
7 A11271-2TE	0	21.9	23.7	22.8	1	3.8	2	26.5	28.9	27.7	4.3	1
8 A12305-2adg	0	9.9	16.2	13.0	0	6.4	4	15.4	26.8	21.1	11.4	3
9 AFA5661-8	0	16.4	19.6	18.0	0	3.8	3	20.2	27.6	23.9	8.4	2
10 AOR11217-3	0	14.5	18.7	16.6	0	4.2	3	24.3	30.1	27.2	6.1	2
11 COA11013-2	0	18.0	21.7	19.9	1	3.9	3	24.2	32.6	28.4	8.4	2
LSD 0.05	ns			2.1		2.7				3.4	4.0	
Average	0	15.0	19.8	17.4		5.3	3	22.2	29.8	26.0	8.7	2
Idaho												
1 Ranger Russet	0	19.7	29.6	24.7	2	9.9	2	30.4	40.2	35.3	9.9	1
2 Russet Burbank	0	15.0	21.3	18.2	0	6.3	3	18.6	30.7	24.7	13.1	3
3 Clearwater	0	21.1	31.5	26.3	2	10.5	2	23.6	39.0	31.3	15.4	2
4 A09119-4LB	0	21.1	24.6	22.9	1	5.8	2	24.2	27.8	26.0	4.2	2
5 A10594-4sto	0	22.4	28.6	25.5	2	6.6	2	28.9	35.5	32.2	7.7	1
6 A11188-1	0	19.4	19.6	19.5	1	2.8	3	24.9	28.0	26.5	6.3	1
7 A11271-2TE	0	31.7	32.4	32.0	3	4.5	0	33.8	34.9	34.4	3.9	0
8 A12305-2adg	0	13.5	21.9	17.7	0	8.5	4	16.3	23.5	19.9	7.4	3
9 AFA5661-8	0	22.4	24.1	23.3	1	3.5	2	25.7	32.4	29.1	6.9	1
10 AOR11217-3	0	22.0	26.3	24.1	1	6.2	2	25.4	34.6	30.0	9.5	1
11 COA11013-2	0	25.7	31.3	28.5	2	6.2	1	29.1	41.9	35.5	13.5	1
LSD 0.05	ns			2.8		2.9				3.1	4.2	
Average	0	21.3	26.5	23.9		6.4	2	25.5	33.5	29.5	8.9	1
Oregon												
Oregon samples were held at 40 for 57 days												
1 Ranger Russet	0	16.6	23.1	19.9	1	7.1	3	17.0	30.5	23.8	13.5	3
2 Russet Burbank	0	15.7	20.7	18.2	0	5.9	3	15.7	19.5	17.6	4.2	3
3 Clearwater	0	34.6	39.5	37.1	4	6.5	0	28.2	38.2	33.2	10.0	1
4 A09119-4LB	0	23.1	22.3	22.7	1	4.8	2	25.1	28.8	26.9	4.1	1
5 A10594-4sto	0	24.0	32.0	28.0	2	8.7	2	24.1	39.4	31.8	15.3	2
6 A11188-1	0	12.7	13.8	13.2	0	2.3	4	15.3	18.5	16.9	4.9	3
7 A11271-2TE	0	33.8	27.9	30.8	3	7.5	0	28.0	26.3	27.2	5.1	1
8 A12305-2adg	0	16.8	25.1	20.9	1	8.5	3	16.7	27.7	22.2	11.0	3
9 AFA5661-8	0	31.6	28.3	29.9	2	4.1	0	32.6	37.5	35.0	7.0	0
10 AOR11217-3	0	28.8	32.6	30.7	3	4.8	1	26.4	32.5	29.4	6.9	1
11 COA11013-2	0	30.3	29.8	30.0	2	2.2	1	27.0	33.4	30.2	7.7	1
LSD 0.05	ns			3.4		3.0				4.1	4.1	
Average	0	24.4	26.8	25.6		5.7	2	23.3	30.2	26.7	8.2	2

Date test performed:

Washington

Dec. 16

Dec. 5

Dec. 13

Idaho

Dec. 16

Dec. 9

Dec. 14

Oregon

Dec. 16

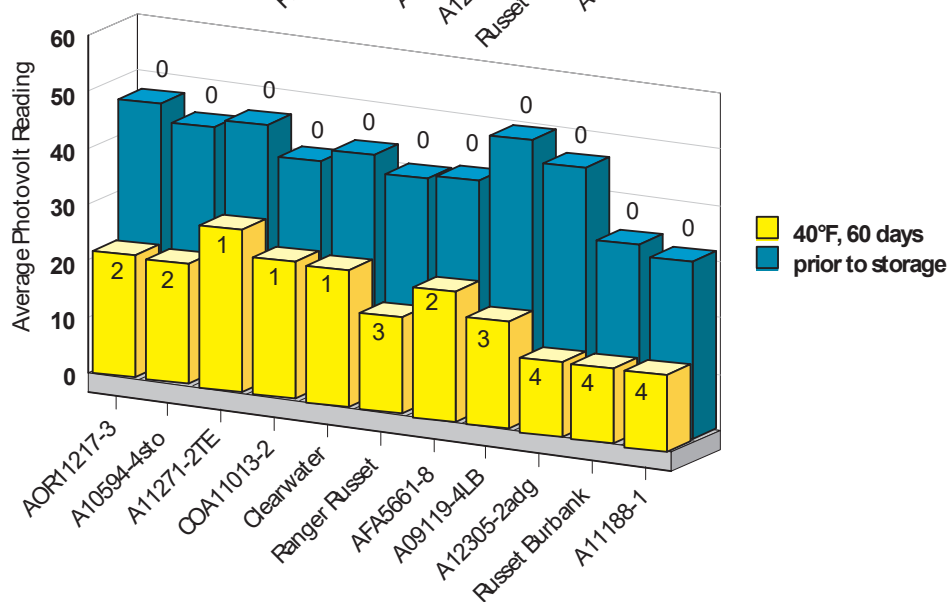
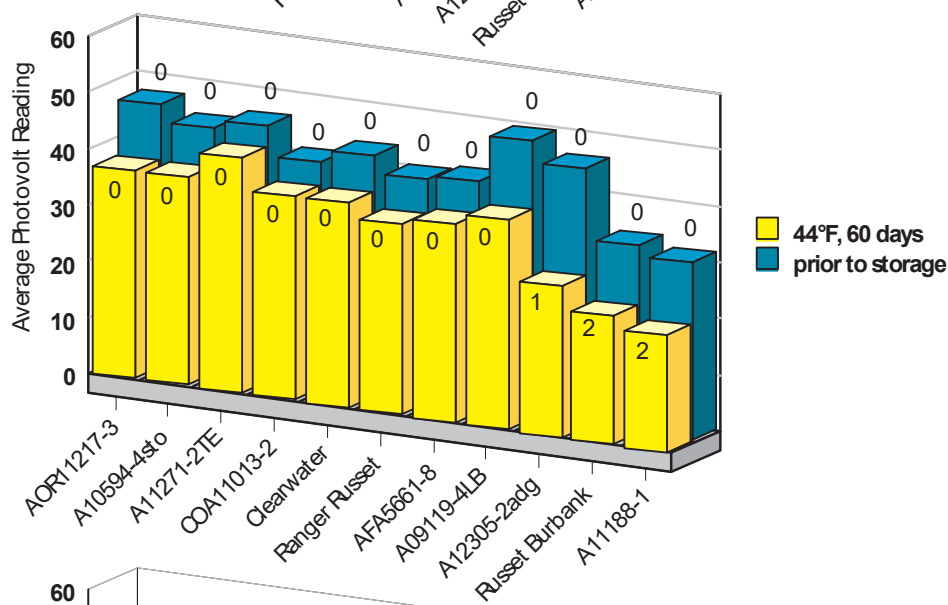
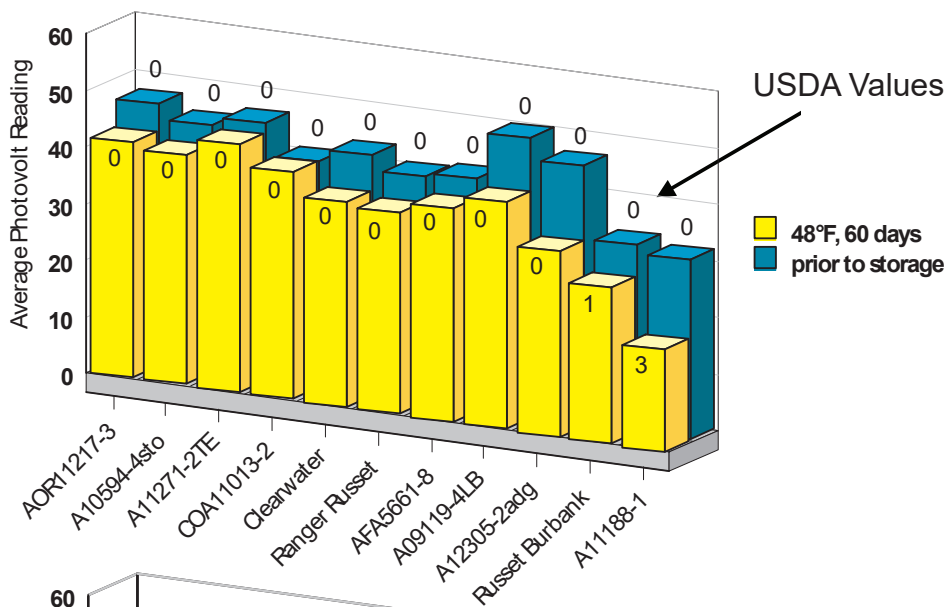
Dec. 12

Dec. 15

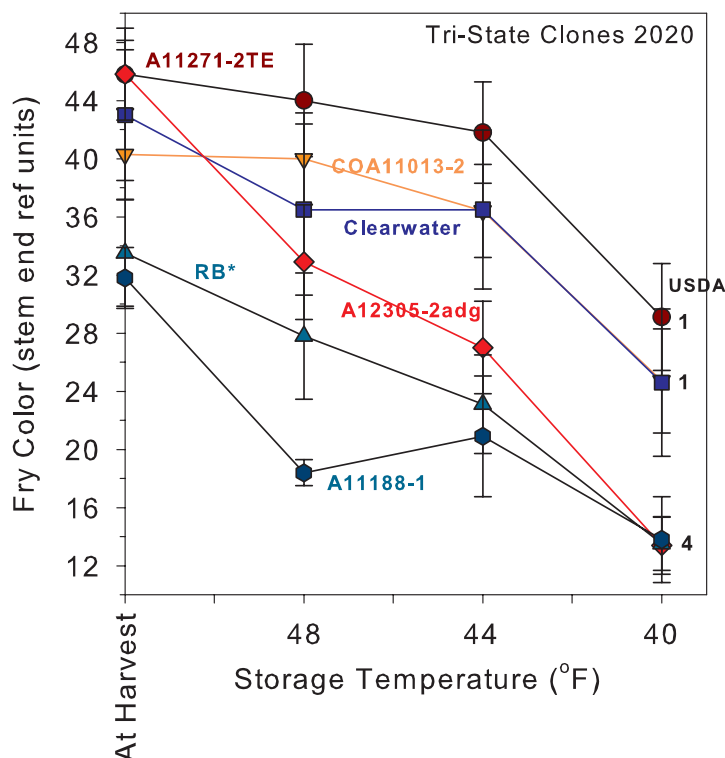
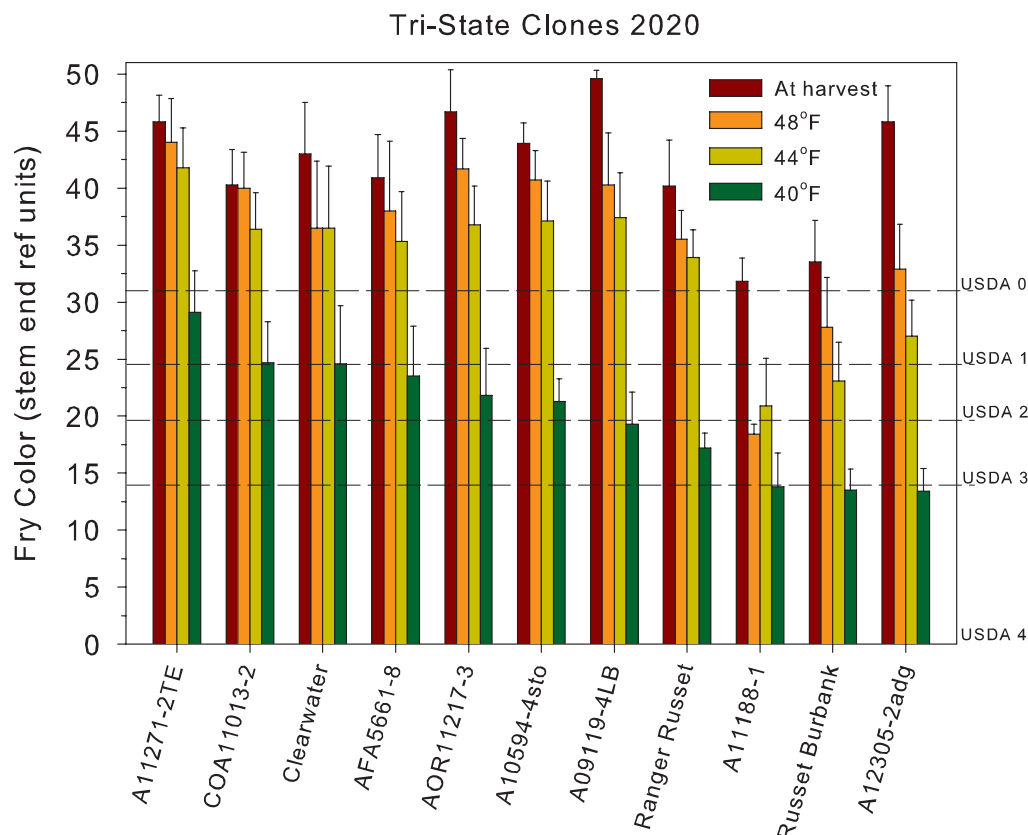
DIFF = Absolute difference between bud and stem Photovolt reading.

Tri-State Trial - 3 State Average of Stem End

2020 Late Harvest Tri-State Trial



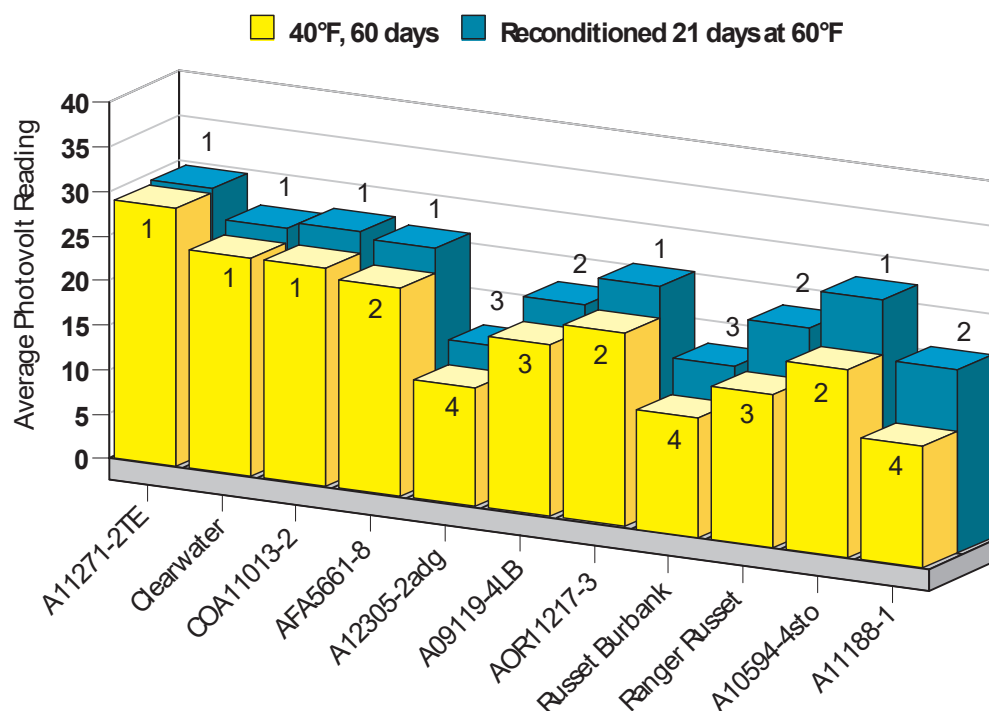
2020 Late Harvest Tri-State Trial



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.

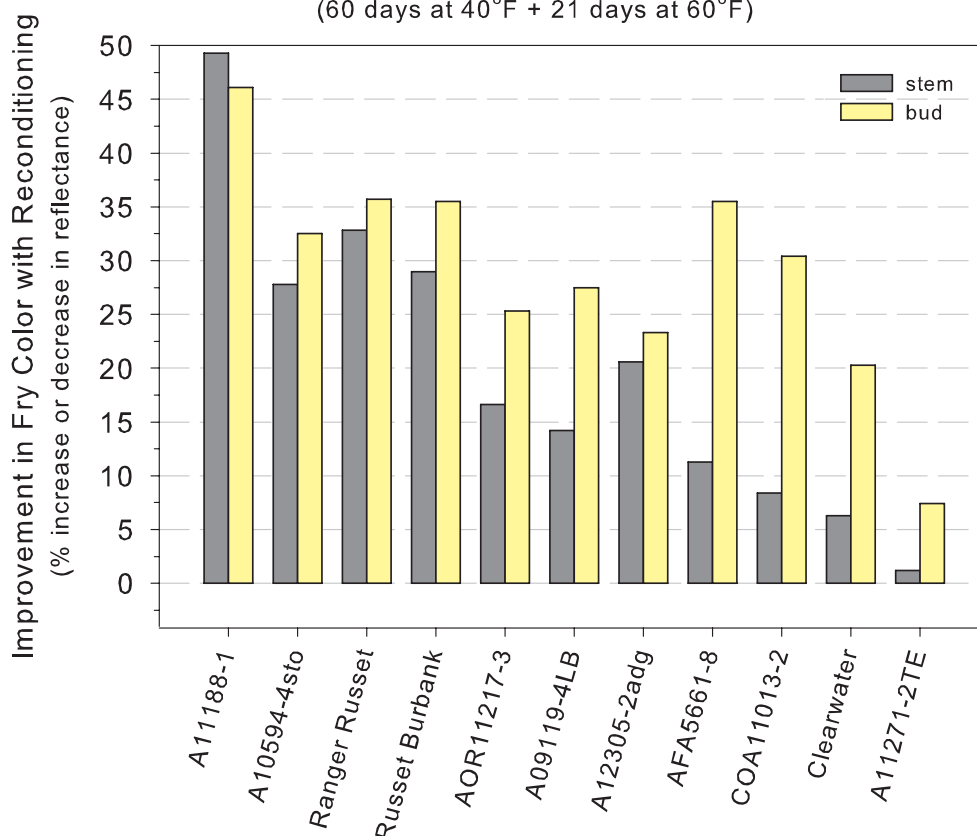
Bottom: Line graph depicting the effects of storage temperature on change in French fry processing quality (stem end fry color) of the most cold sweetening resistant (A11271-2TE, COA11013-2, and Clearwater Russet) and susceptible (A12305-2adg, RB*, and A11188-1) clones in the Tri-State Trial. *Indicates similar performance of the clones last year.

2020 Late Harvest Tri-State Trial



Reconditioning Ability - Tri-State Clones 2020

(60 days at 40°F + 21 days at 60°F)



Reconditioning abilities of clones in the 2020 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. Numbers in bars indicate the USDA color rating of the stem end. **Bottom:** Percent improvement of stem and bud end fry color with reconditioning.

2020 Late Harvest Tri-State Trial

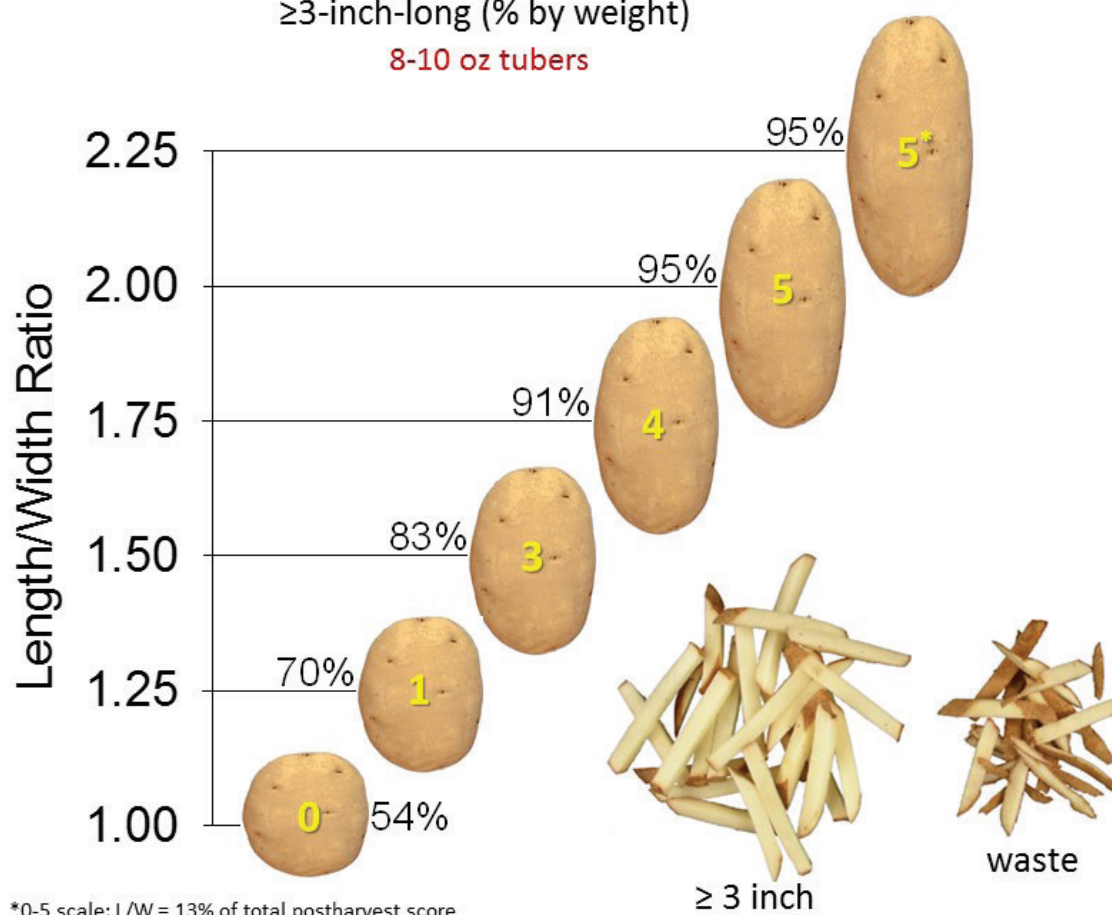
Length to Width Ratios of 8-10 oz Tubers

Clone	Length to width ratio						3 State Avg.
	WA	rtg §	ID	rtg §	OR	rtg §	
1 Ranger Russet	1.70	4	2.36	5	2.02	5	2.03
2 Russet Burbank	1.71	4	2.19	5	1.93	5	1.95
3 Clearwater	1.60	3	1.84	5	1.61	3	1.68
4 A09119-4LB	1.52	3	1.67	4	1.49	2	1.56
5 A10594-4sto	1.68	4	1.94	5	1.73	4	1.78
6 A11188-1	1.55	3	1.61	3	1.47	2	1.54
7 A11271-2TE	1.52	3	1.65	4	1.48	2	1.55
8 A12305-2adg	1.70	4	2.07	5	1.87	5	1.88
9 AFA5661-8	1.49	2	1.67	4	1.46	2	1.54
10 AOR11217-3	1.69	4	1.96	5	1.66	4	1.77
11 COA11013-2	1.87	5	1.87	5	1.91	5	1.89
Average	1.64		1.89		1.69		1.74

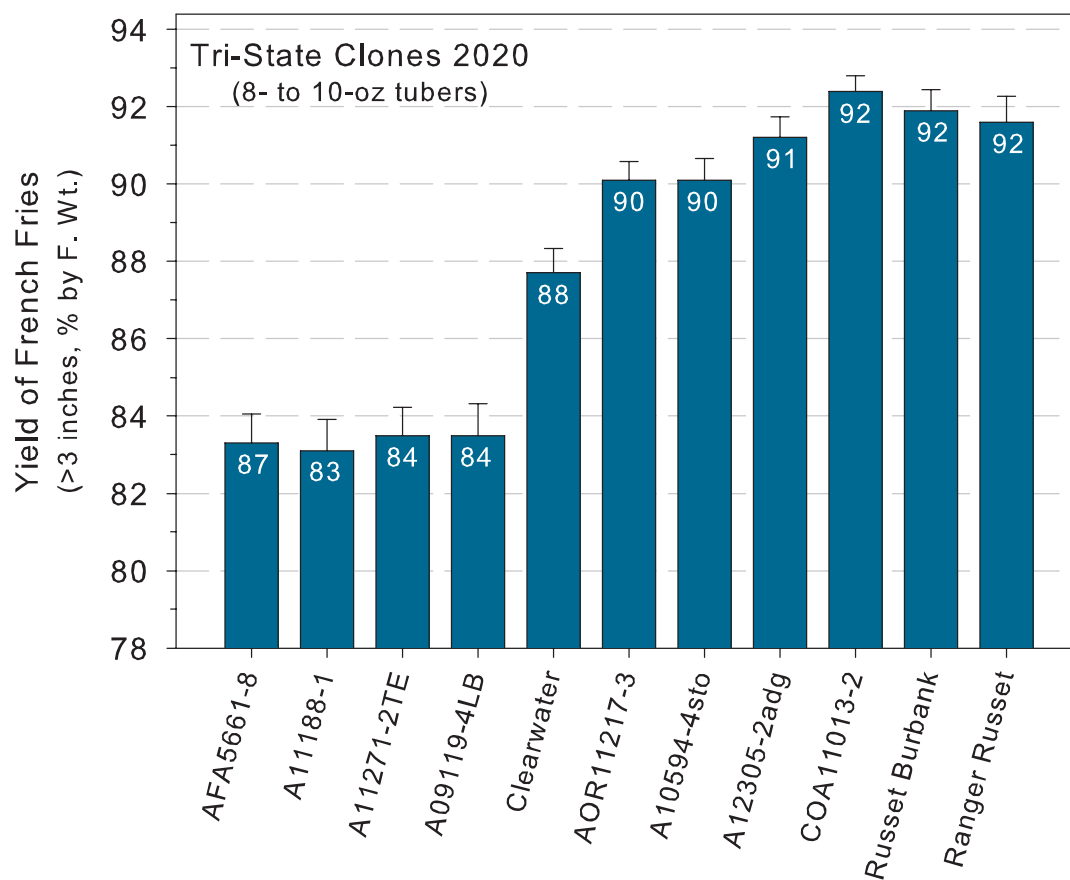
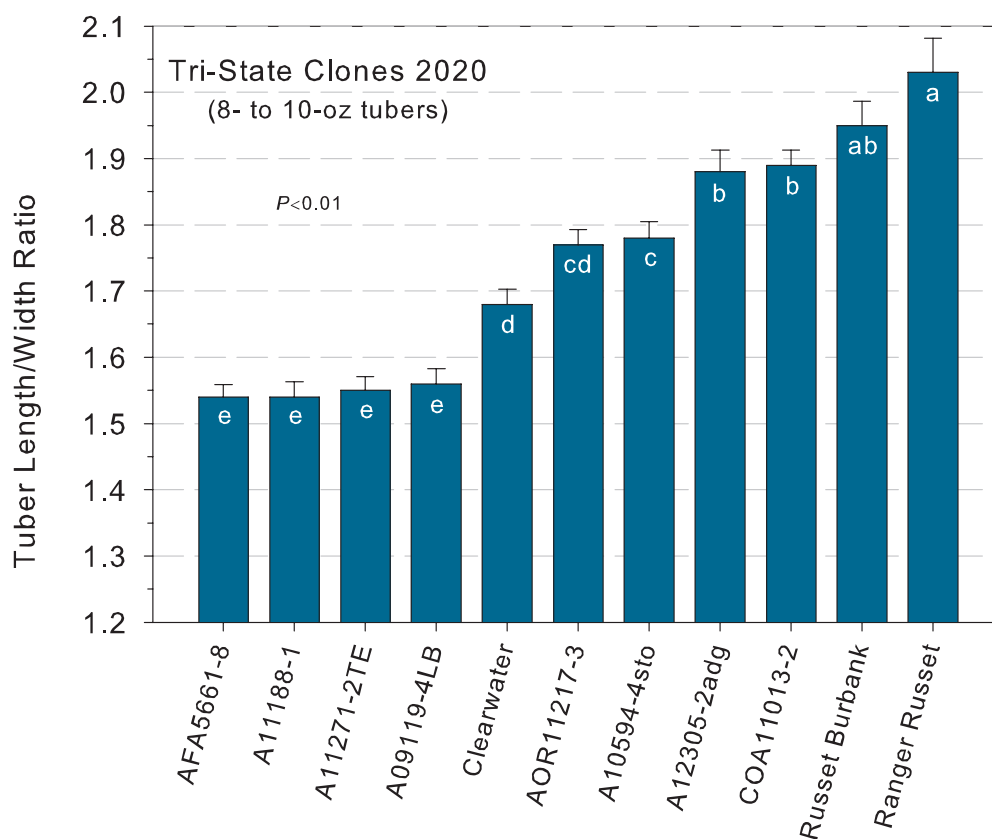
French Fry Yield vs Tuber L/W Ratio

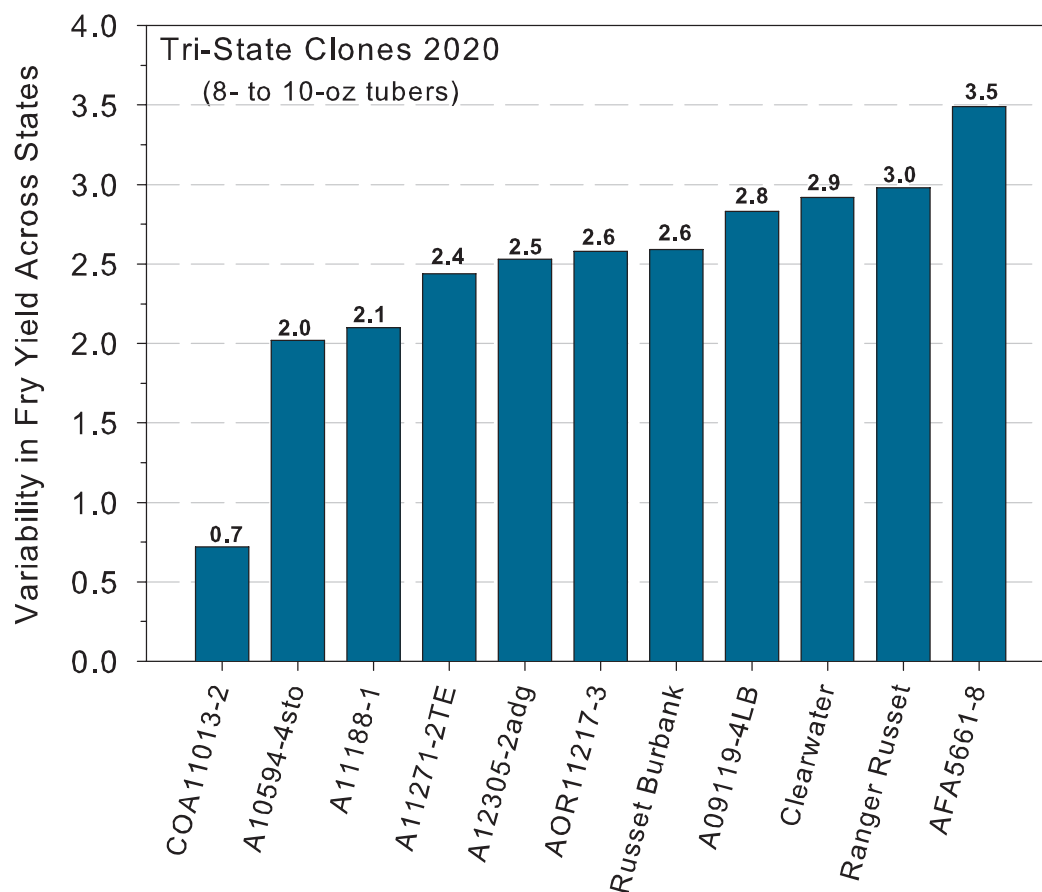
≥3-inch-long (% by weight)

8-10 oz tubers



2020 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, AFA5661-8 had a length to width ratio of 1.54, resulting in 87% 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 83.5 to 90.5% ($87 \pm 3.5\%$).

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

2020 Early Harvest Regional Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 2

Vine Kill Date: July 24

Harvest Date: August 10

Days Grown: 113

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 2020 early harvest trial compared 5 local reference varieties to 12 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): AOR08540-1

Process Market Standout(s): POR12NCK50-1, OR12133-10, AOR08540-1, and A07769-4

Yield and Economic Data

➤ Total Yield and U.S. #1 Yield

Highest: AOR08540-1 had the highest total yield (754 CWT/A) and the highest U.S. #1 yield (634 CWT/A). TX13590-9RU had the second highest total yield (711 CWT/A) and the second highest U.S. #1 yield (623 CWT/A).

Lowest: Russet Norkotah had the lowest total yield (500 CWT/A) and CO10085-1RU had the lowest U.S. #1 yield (360 CWT/A). CO11009-3RU had the second lowest total yield (516 CWT/A); CO10091-1RU had the second lowest U.S. #1 yield (364 CWT/A).

➤ % U.S. #1's (greater than 4 oz)

Highest: A071012-4BF and TX13590-9RU (88%), Shepody (87%).

Lowest: CO10085-1RU and Russet Burbank (67%), CO10091-1RU (68%).

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

Highest: TX13590-9Ru (21.5 Tons/A) and OR12133-10 (20.7 Tons/A).

Lowest: CO10091-1RU (6.6 Tons/A) and CO11009-3RU (9.9 Tons/A).

➤ Gross Return (\$/acre)

Fresh Market Highest: TX13590-9Ru and AOR08540-1.

Fresh Market Lowest: CO10091-1RU, CO10085-1RU, and CO11009-3RU.

Process Market Highest: AOR08540-1 and A071012-4BF.



Cutting and measuring
Clearwater Russet for a seed
size trial. Seed size ranged
from 0.5 oz to 3.5 oz.



2020 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)	% of Total Yield	> 6 oz	Tons/A
Ranger Russet	567	CDE	28.4	79	7	14	53	14.9	71	20.2
Russet Burbank	667	ABC	33.3	67	4	28	47	15.8	59	20.3
Russet Norkotah	500	E	25.0	81	2	16	47	11.8	64	16.0
Clearwater Russet	684	AB	34.2	83	4	13	53	18.0	67	22.9
Shepody	621	BCD	31.1	87	4	9	51	15.7	85	26.3
A071012-4BF	653	ABC	32.7	88	5	7	61	20.1	80	26.1
A07769-4	647	ABC	32.3	86	2	12	50	16.2	70	22.6
A10021-5TE	695	AB	34.7	77	6	18	52	18.0	73	25.2
AOR08540-1	754	A	37.7	84	3	13	55	20.6	70	26.3
AOR10204-3	680	AB	34.0	79	6	15	48	16.4	67	22.9
CO10085-1RU	532	DE	26.6	67	0	33	41	10.8	50	13.6
CO10087-4RU	563	CDE	28.2	83	1	16	51	14.4	62	17.4
CO10091-1RU	535	DE	26.7	68	0	32	25	6.6	39	10.6
CO11009-3RU	516	DE	25.8	77	2	21	39	9.9	50	13.1
OR12133-10	666	ABC	33.3	86	2	12	62	20.7	74	24.8
POR12NCK50-1	685	AB	34.3	86	1	13	60	20.7	72	24.9
TX13590-9Ru	711	AB	35.5	88	1	11	61	21.5	73	25.8

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
Ranger Russet	447	CD	22.4	32	61	7	1.078	0	0	0
Russet Burbank	460	BCD	23.0	27	52	21	1.080	13	20	0
Russet Norkotah	406	D	20.3	38	54	8	1.075	0	0	0
Clearwater Russet	566	AB	28.3	36	60	4	1.081	0	0	0
Shepody	539	ABC	27.0	14	43	43	1.078	0	0	3
A071012-4BF	574	AB	28.7	23	56	21	1.086	0	0	0
A07769-4	554	ABC	27.7	39	50	11	1.080	0	0	0
A10021-5TE	534	ABC	26.7	25	59	16	1.079	0	0	0
AOR08540-1	634	A	31.7	32	58	10	1.078	0	0	0
AOR10204-3	533	ABC	26.6	34	53	13	1.072	0	0	0
CO10085-1RU	360	D	18.0	40	54	6	1.079	0	0	0
CO10087-4RU	468	BCD	23.4	38	55	8	1.086	0	0	0
CO10091-1RU	364	D	18.2	63	35	2	1.075	0	0	0
CO11009-3RU	399	D	19.9	49	41	10	1.079	0	0	0
OR12133-10	574	AB	28.7	28	70	2	1.080	0	0	0
POR12NCK50-1	593	A	29.6	30	65	4	1.081	0	0	0
TX13590-9Ru	623	A	31.2	29	55	16	1.077	5	0	0

* Percent values may not total 100% due to rounding

ENTRY	30 DAY STAND	50 DAY STAND	STEMS PER PLANT	TUBER GREENING	AVERAGE TUBER		SKIN SET	TUBER SHAPE	BRUISE (%)	
	% Emerged	% Emerged	Above Ground	% Total Yield	Ounces	Tubers/Plant	1 = Poor 5 = Good	1 = Round 5 = Long	(8-12 oz tubers) BLACKSPOT	SHATTER
Ranger Russet	0	98	2.0	1	7.3	7.6	3.0	4.0	10	0
Russet Burbank	9	100	2.0	3	7.3	8.9	3.0	4.0	7	7
Russet Norkotah	4	91	2.7	1	6.2	8.0	4.0	4.0	5	25
Clearwater Russet	0	100	2.4	2	6.4	10.5	2.7	4.0	0	0
Shepody	2	98	1.8	3	9.5	6.4	4.0	3.0	0	0
A071012-4BF	7	100	2.1	1	7.9	8.1	4.0	2.7	3	0
A07769-4	0	100	3.5	1	6.2	10.2	4.0	2.3	0	52
A10021-5TE	0	96	2.8	4	7.9	8.6	3.0	3.0	5	5
AOR08540-1	11	100	2.6	4	6.8	10.9	3.0	3.0	0	7
AOR10204-3	0	89	2.7	2	6.9	9.7	3.0	3.0	0	17
CO10085-1RU	9	98	2.9	0	5.2	10.0	3.0	3.5	0	10
CO10087-4RU	0	89	2.9	1	6.2	8.9	3.7	4.0	0	43
CO10091-1RU	0	98	2.2	1	4.7	11.4	4.0	2.5	0	28
CO11009-3RU	4	98	2.7	1	5.3	9.6	2.3	4.0	2	14
OR12133-10	47	98	2.0	2	6.7	9.8	3.0	2.0	0	10
POR12NCK50-1	0	98	2.1	1	6.6	10.2	2.7	4.0	0	13
TX13590-9Ru	0	96	2.7	4	6.9	10.1	3.0	2.3	5	5

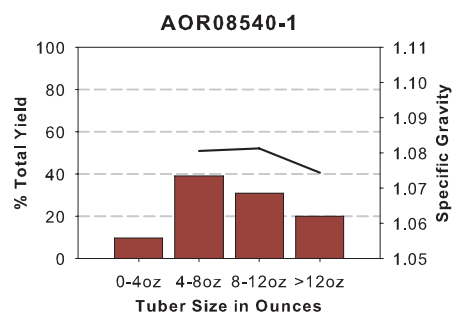
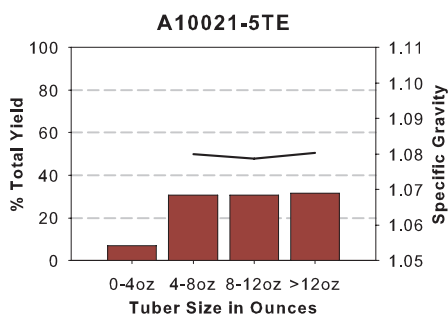
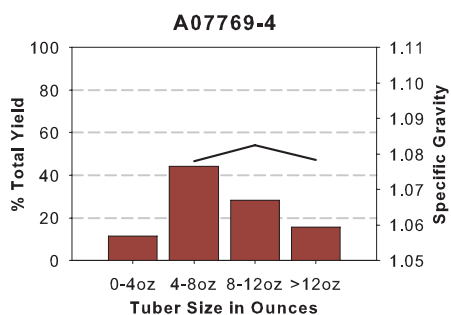
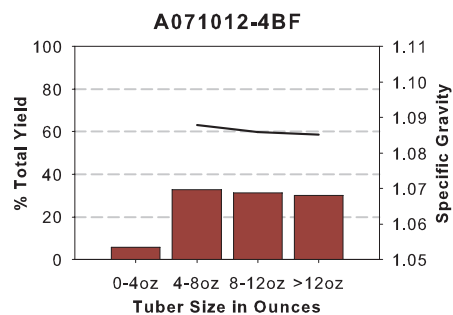
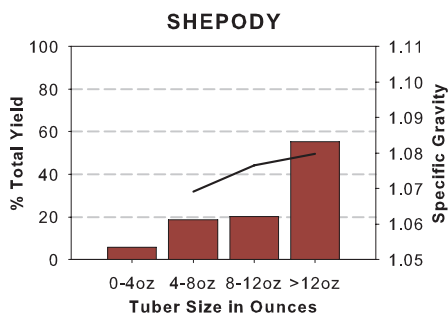
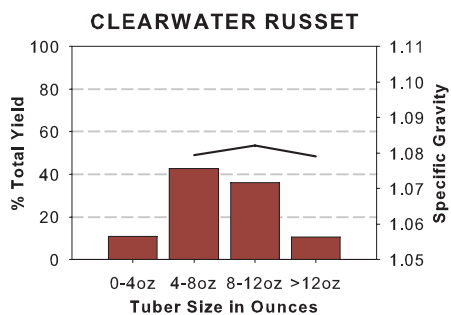
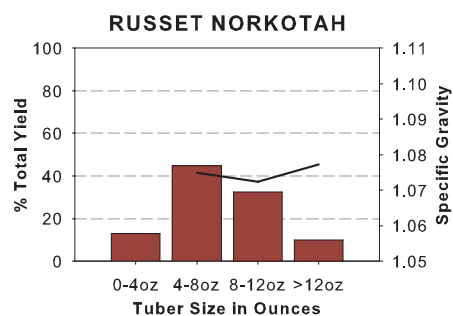
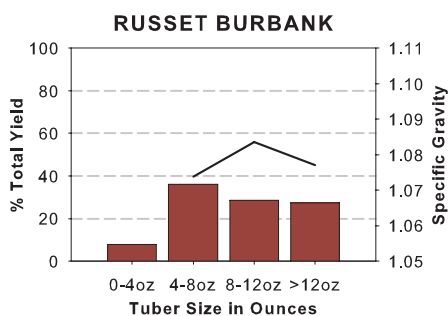
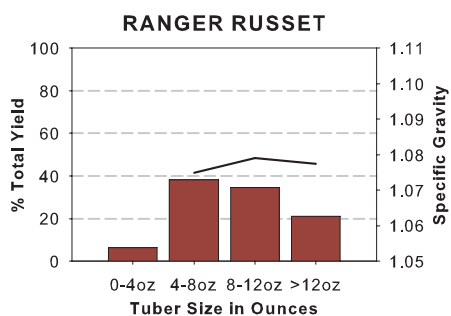
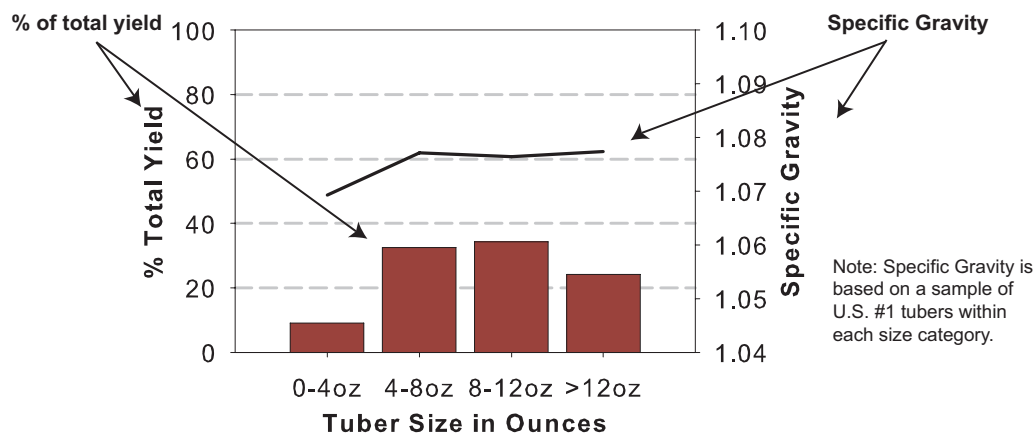


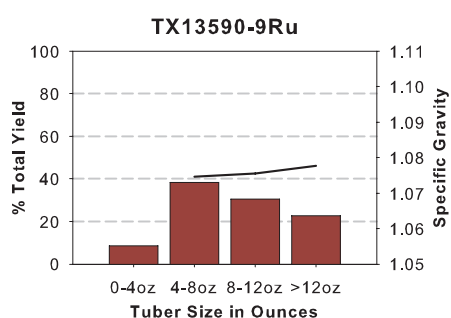
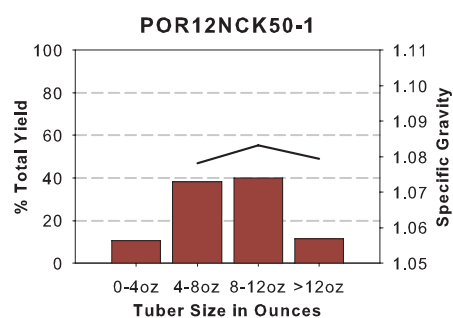
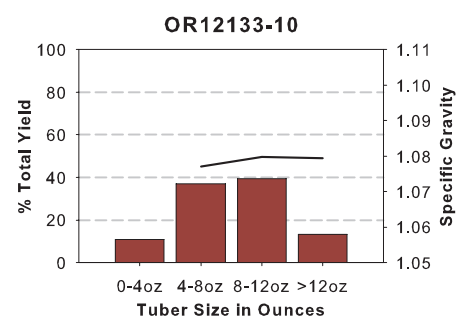
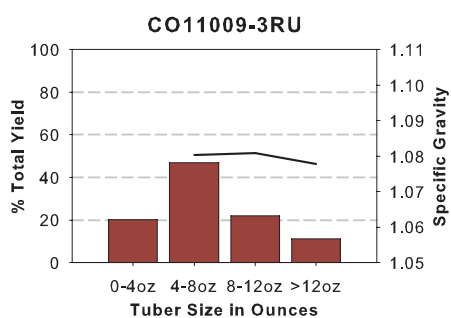
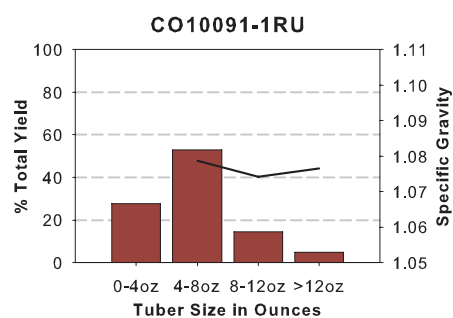
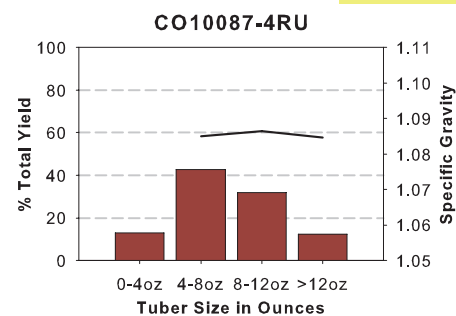
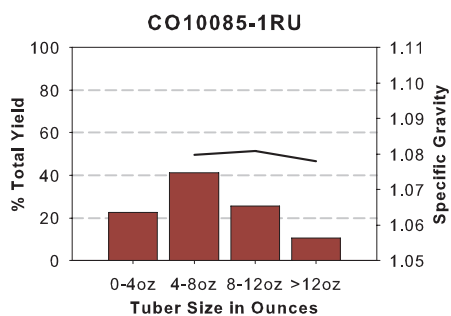
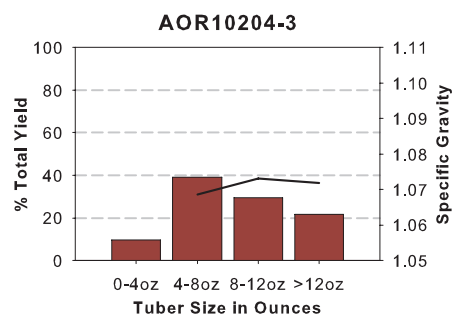
This is what happens when you have to bring your kids to work with you!

2020 Early Harvest Regional Trial

Tuber Yield and Specific Gravity Distributions

12 inch In-Row Spacing





2020 Early Harvest Regional Trial

Tubers

Ranger Russet



Russet Burbank



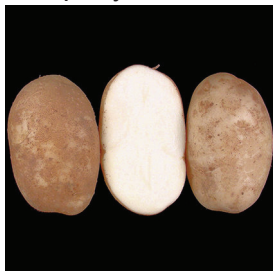
Russet Norkotah



Clearwater Russet



Shepody



A071012-4BF



A07769-4



A10021-5TE



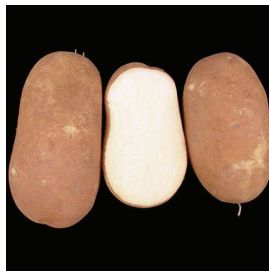
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CO10085-1RU



CO10087-4RU



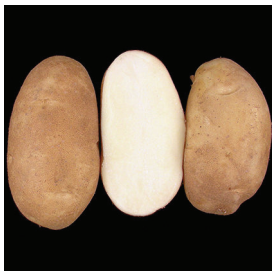
CO10091-1RU



CO11009-3RU



OR12133-10



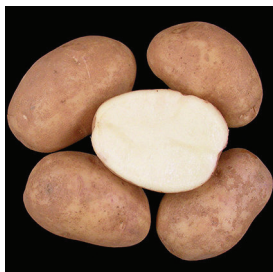
POR12NCK50-1



AOR10204-3



TX13590-9Ru



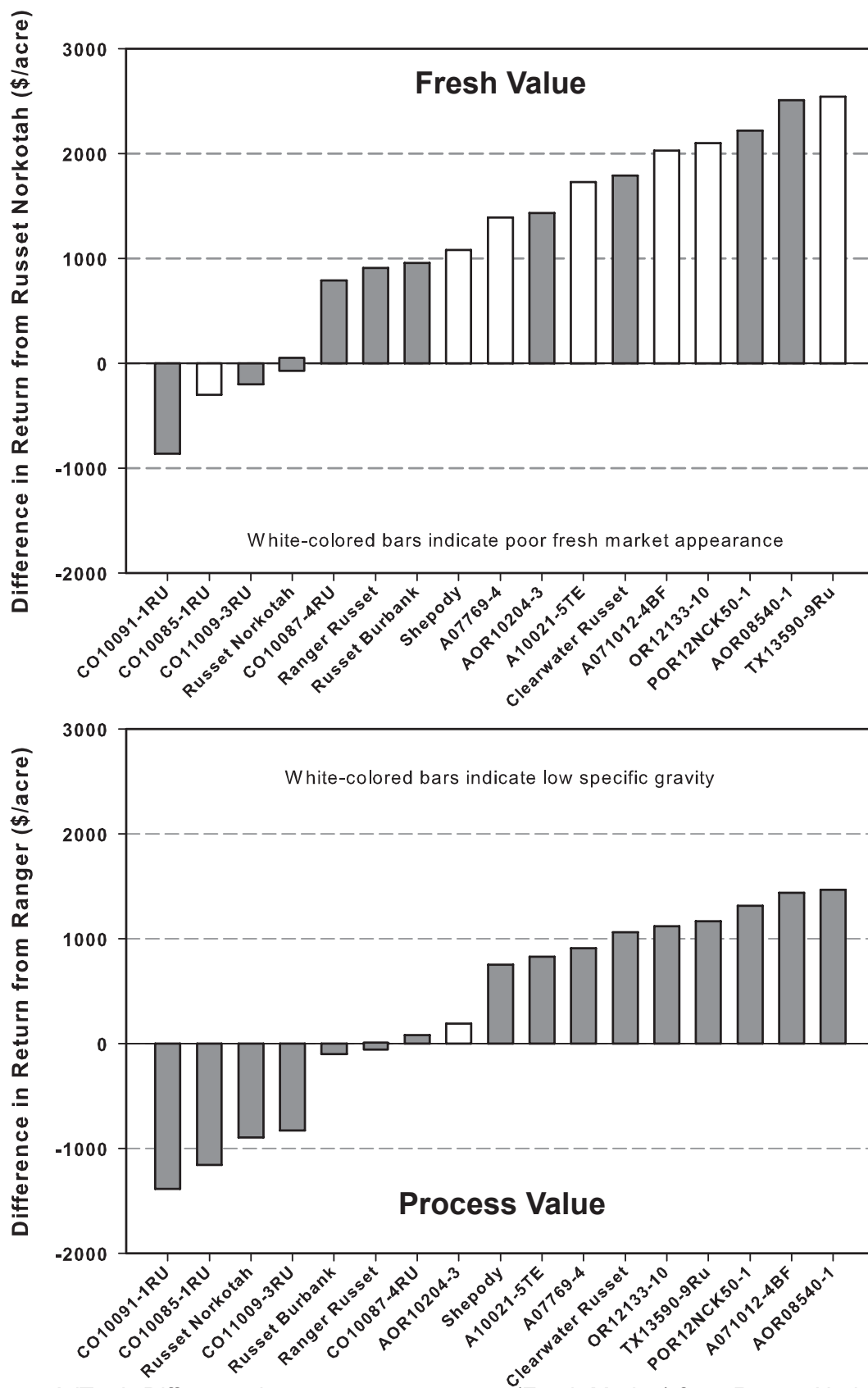


Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to the undesirable shape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

2020 Late Harvest Regional Trial

Location: WSU Research Center – Othello, WA

Planting Date: March 31

Vine Kill Date: Sept 2

Harvest Date: Sept 15

Days Grown: 155

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 12 new clones. The following is a summary of the Washington field and post harvest results. For additional information, see the grading comments and merit scores near front of book.

Fresh Market Standout(s): NONE

Process Market Standout(s): POR12NCK50-1, AO7769-4, and CO11009-3RU

Yield and Economic Data

➤ **Total and U.S. #1 Yield**

Highest: OR12133-10 had the highest total yield (1174 CWT/A) the highest U.S. # 1 yield (1054 CWT/A). AO7769-4 had the second highest total yield (1111 CWT/A) and TX13590-9Ru had the second highest U.S. #1 yield (881 CWT/A).

Lowest: Russet Norkotah had the lowest total yield (661 CWT/A) and CO10087-4RU had the lowest U.S. #1 yield (540 CWT/A).

➤ **% U.S. #1 Yield Greater Than 4oz.**

Highest: AO7769-4 (91%) and TX13590-9Ru (90%).

Lowest: AOR10204-3 (70%), A10021-5TE (73%).

➤ **Carton Yield (100 to 50 Count (7 to 18 oz US #1 Tubers))**

Highest: OR12133-10 (36.1 Tons/A), Clearwater Russet (31.0 Tons/A).

Lowest: CO10087-4RU (16.2 Tons/A), A10021-5TE (19.0 Tons/A).

➤ **Gross Return (\$/acre)**

Fresh Market Highest: OR12133-10, Clearwater Russet, and POR12NCK50-1.

Fresh Market Lowest: CO10087-4RU, A10021-5TE, and A071012-4BF.

Process Market Highest: OR12133-10, POR12NCK50-1, and Clearwater Russet.

Process Market Lowest: Norkotah Russet, CO10087-4RU, and AOR10204-3.

2020 Late Harvest Regional Trial

Postharvest Information

The 2020 trial evaluated ten numbered clones along with Ranger Russet, Russet Burbank, and Clearwater Russet as check cultivars from each growing location. When averaged across states, all entries received higher overall postharvest scores than Russet Burbank (RB). An asterisk in the summary below indicates similar performance and/or ranking in trials from previous years.

➤ Overall Postharvest Rating

Highest scoring: CO11009-3RU, A10021-5TE*, Clearwater, CO10087-4RU*

Lowest scoring: RB*, CO10091-1RU*, A07769-4, A071012-4BF

➤ Low Temperature Sweetening

Most resistant: CO11009-3RU, Clearwater

Most susceptible: AOR08540-1, RB*, CO10085-1RU

➤ Tuber asparagine content (WA Regional Trial samples)

Highest concentration: A10021-5TE, CO10090-1RU

Lowest concentration: A071012-4BF*, CO11009-3RU, AOR08540-1

➤ French Fry Taste Panel

Highest rated: CO11009-3RU, CO10087-4RU*, A10021-5TE*

Lowest rated: RB*, CO10085-1RU, OR12133-10*

➤ Blackspot Bruise Susceptibility

Most resistant: CO10091-1RU*, AOR08540-1, POR12NCK50-1

Most susceptible: RR*, OR12133-10, A071012-4BF*

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

Lowest L/W: CO10091-1RU*, A07769-4*, OR12133-10

Highest L/W: RR*, A10021-5TE*, RB*

Least variable: CO10091-1RU, CO10087-4RU, RR

Most variable: CO10085-1RU, AOR08540-1

Details

- CO11009-3RU, A10021-5TE*, Clearwater, and CO10087-4RU* were the highest rated entries, accumulating an average of 32.6, 27.1, 26.6, and 25.5 of 38 possible points, respectively. Overall scores (range and average across clones) were on par with last year.
- CO11009-3RU and Clearwater were resistant to cold sweetening, producing USDA 0-2 fries (stem end) when stored for 60 days at 40°F averaged across locations. AOR08540-1, RB*, and CO10085-1RU were susceptible to LTS, producing USDA 3-4 fries after 60 days at 40°F.
- A071012-4BF*, CO11009-3RU, and AOR08540-1 had 39, 20 and 18% lower ($P<0.05$) concentrations of asparagine (asn) (acrylamide precursor) than RB, respectively. A071012-4BF also averaged 43% lower asparagine than RB in the 2019 trials. However, A071012-4BF 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.
- RB*, CO10091-1RU*, A07769-4, and A071012-4BF scored lowest on overall postharvest performance with 15.0, 19.0, 21.4, and 20.5 of 38 possible points, respectively.

- CO10091-1RU, RB*, and OR12133-10 had gravities of 1.073-1.074 when averaged across states (too low for processing contracts). Five of the 13 entries from the WA trial and 6/13 entries from the OR trial had gravities <1.075.
- CO11009-3RU, CO10087-4RU*, and A10021-5TE* were the favorites in the French fry taste panels, averaging 3.5/5 across growing locations (5 is best). RB*, CO10085-1RU, and OR12133-10* were the lowest scoring clones (avg = 2.6/5).
- On average, tubers grown in OR produced the lightest fry colors at harvest. The Regional entries averaged 88 and 76% of their at-harvest process quality (stem end fry color) when stored at 48 and 44°F for 60 days, respectively.
- In contrast to the 2019 trial, uniformity of fry color at harvest (bud to stem end fry color difference) was good this year with only 2/13 WA entries (RB and CO10087-4RU) rated unacceptable for fry color uniformity. All entries from the ID and OR trials fried uniformly light at harvest. OR12133-10*, POR12NCK50-1, and A07769-4 varied the most in retention of at-harvest process quality when stored for 60 days at 44°F across production sites.
- CO10085-1RU, CO10091-1RU*, RR, and POR12NCK50-1 showed the greatest improvement in stem end fry color when reconditioned at 60°F following storage for 60 days at 40°F. Reconditioning tubers of A071015-4BF, Clearwater, A10021-5TE, and CO10087-4RU* had little effect on change in stem end fry color. A071012-4BF, OR12133-10, and CO10085-1RU appeared more susceptible to sugar end development based on attenuated reconditioning of the stem versus bud end of tubers following storage at 40°F.
- CO10091-1RU*, AOR08540-1, and POR12NCK50-1 were resistant to blackspot, averaging 22.2% bruise (stem end) in the controlled impact study (3-state average). These entries also scored lowest in bruise severity, averaging 1.5/5 (1= no bruise; 5= 100% of impact area is dark). RR*, OR12133-10, and A071012-4BF* were highly susceptible, averaging 82% bruise. Bruise severity was also greatest in those three entries (average 3.3/5).
- ID-grown tubers (8-10 oz) had the highest L/W ratios (1.99) compared with those grown in OR (1.70) and WA (1.67). CO10091-1RU*, A07769-4*, and OR12133-10 had the lowest L/W ratios (avg. 1.61), reflecting a rounder tuber shape phenotype. RR*, A10021-5TE*, and RB* had the highest L/W ratios (1.95-2.03). CO10085-1RU* and AOR08540-1 showed the greatest variation in L/W ratios of 8- to 10-oz tubers across production sites. By contrast, the L/W ratios of CO10091-1RU*, CO10087-4RU, and RR were least affected by growing location.
- On average, 89% of OR12133-10*, CO10085-1RU, and CO10091-1RU tubers had sprouted (0.9- to 1.8-inch-long sprouts) following 60 days at 48°F, indicating relatively short dormancy (RR = 44% with 0.33-inch sprouts). By contrast, only 13 and 22% of AOR08540-1 and CO11009-3RU tubers sprouted, respectively, averaging 0.06-inch-long sprouts. RB* tubers did not sprout.
- After 7 months of storage (3 months at 48°F + 4 months at 44°F), sprout lengths ranged from 0.5 to 2.5 inches depending on clone and state. POR12NCK50-1 produced the longest sprouts (avg = 2.2 inches), which indicates short dormancy. By contrast, CO10091-1RU only averaged 0.5-inch-long sprouts, which indicates relatively long dormancy. Sprouts from RB averaged 1 inch in length.

- When stored for 7 months, fries from A07769-4 were often mottled or very dark in the mid-section. A10021-5TE produced the lightest fries (46.1 ref units) after 7 months, which is consistent with results from the past two years. A10021-5TE and POR12NCK50-1 were the only two entries to produce uniform fry color (stem to bud Photovolt difference) consistently across production sites.

Overall Regional Postharvest Merit Scores

Clone	Postharvest Merit Scores			3 state Average
	WA	ID	OR	
11 CO11009-3RU	3.9	4.6	4.4	4.3
6 A10021-5TE	3.1	4.1	3.6	3.6
3 Clearwater	2.5	4.1	3.9	3.5
9 CO10087-4RU	2.4	3.8	3.9	3.4
1 Ranger Russet	2.8	3.6	3.3	3.2
13 POR12NCK50-1	2.8	3.9	3.5	3.2
12 OR12133-10	2.4	3.5	3.1	3.0
7 AOR08540-1	2.7	3.1	2.8	2.9
8 CO10085-1RU	2.1	2.9	3.5	2.9
4 A071012-4BF	2.1	2.6	3.8	2.8
5 A07769-4	2.8	2.4	3.3	2.8
10 CO10091-1RU	1.8	No Sample	3.2	2.5
2 Russet Burbank	1.3	2.0	2.7	2.0

2020 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
Ranger Russet	911	CD	45.5	77	14	9	52	23.8	86	39.4
Russet Burbank	1052	ABC	52.6	74	9	17	47	25.2	72	38.3
Russet Norkotah	661	E	33.1	83	3	14	62	20.6	75	24.8
Clearwater Russet	979	BCD	48.9	88	2	9	64	31.0	80	39.3
A071012-4BF	998	BCD	49.9	73	6	21	39	19.3	76	38.0
A07769-4	1111	AB	55.6	80	5	15	47	25.4	82	45.7
A10021-5TE	909	CD	45.5	75	8	17	42	19.0	79	35.9
AOR08540-1	880	D	44.0	84	5	10	50	21.8	84	37.2
AOR10204-3	941	CD	47.1	70	13	17	44	19.9	79	36.7
CO10085-1RU	940	CD	47.0	81	5	14	51	24.2	73	34.2
CO10087-4RU	682	E	34.1	79	4	17	47	16.2	60	20.6
CO10091-1RU	877	D	43.8	81	1	19	43	19.2	59	26.1
CO11009-3RU	948	BCD	47.4	83	6	11	51	24.2	83	39.3
OR12133-10	1174	A	58.7	90	3	7	62	36.1	88	51.8
POR12NCK50-1	916	CD	45.8	91	2	7	65	29.6	84	38.9
TX13590-9Ru	1060	ABC	53.0	83	6	11	54	28.8	84	44.7

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)		
				> 4 oz	4-7 oz*	7-14 oz*		% HH	% BC	% IBS
				----- % -----						
Ranger Russet	697	DEF	34.8	11	41	48	1.078	0	3	0
Russet Burbank	773	BCDE	38.7	23	47	31	1.076	0	18	3
Russet Norkotah	548	F	27.4	21	58	21	1.066	0	0	0
Clearwater Russet	860	BC	43.0	20	55	25	1.079	0	0	0
A071012-4BF	730	BCDE	36.5	7	37	57	1.084	0	0	3
A07769-4	880	B	44.0	6	38	57	1.076	0	0	0
A10021-5TE	683	DEF	34.1	9	41	50	1.072	0	0	6
AOR08540-1	738	BCDE	36.9	11	41	48	1.076	0	0	0
AOR10204-3	641	EF	32.1	11	46	43	1.072	0	0	0
CO10085-1RU	764	BCDE	38.2	26	51	23	1.083	0	0	0
CO10087-4RU	540	F	27.0	40	53	7	1.082	0	0	0
CO10091-1RU	711	CDE	35.5	42	46	12	1.079	0	0	0
CO11009-3RU	785	BCDE	39.3	13	43	44	1.088	0	0	0
OR12133-10	1054	A	52.7	10	45	45	1.078	0	0	0
POR12NCK50-1	829	BCD	41.4	16	57	28	1.083	0	0	5
TX13590-9Ru	881	B	44.1	10	44	46	1.074	0	0	0

ENTRY	40 DAY STAND	60 DAY STAND	STEMS PER PLANT	TUBER GREENING	AVERAGE TUBER		SKIN SET	TUBER SHAPE	BRUISE (%)	
	% Emerged	% Emerged	Above Ground	% Total Yield	WEIGHT	NUMBER	1 = Poor 5 = Good	1 = Round 5 = Long	(8-12 oz tubers)	
					Ounces	Tubers/Plant			BLACKSPOT	SHATTER
Ranger Russet	8	89	3.2	4	10.7	7.6	4.0	4.0	28	45
Russet Burbank	15	83	2.9	3	8.7	10.9	4.0	3.0	15	70
Russet Norkotah	18	90	2.7	4	8.0	7.4	5.0	3.0	15	38
Clearwater Russet	6	76	2.9	3	8.3	10.5	3.5	3.0	0	58
A071012-4BF	24	89	2.8	6	13.0	6.9	3.0	3.0	20	75
A07769-4	6	83	3.1	8	11.6	8.6	3.0	3.0	10	78
A10021-5TE	0	72	3.1	8	11.6	7.1	4.0	4.0	3	75
AOR08540-1	0	65	2.7	5	10.2	7.7	4.3	3.0	8	85
AOR10204-3	4	82	2.8	9	11.3	7.4	3.0	3.0	3	58
CO10085-1RU	14	90	3.1	3	7.2	11.8	4.0	2.5	3	53
CO10087-4RU	0	40	6.0	1	5.9	10.4	3.8	3.8	10	90
CO10091-1RU	7	71	3.6	2	5.8	13.6	4.5	2.0	7	53
CO11009-3RU	4	82	3.0	4	10.1	8.4	3.8	2.8	0	68
OR12133-10	33	93	2.0	3	10.3	10.3	4.0	2.8	18	65
POR12NCK50-1	13	86	2.8	1	8.6	9.5	3.0	3.0	13	70
TX13590-9Ru	18	88	3.2	7	9.8	9.6	3.0	2.0	18	70

* Percent values may not total 100% due to rounding

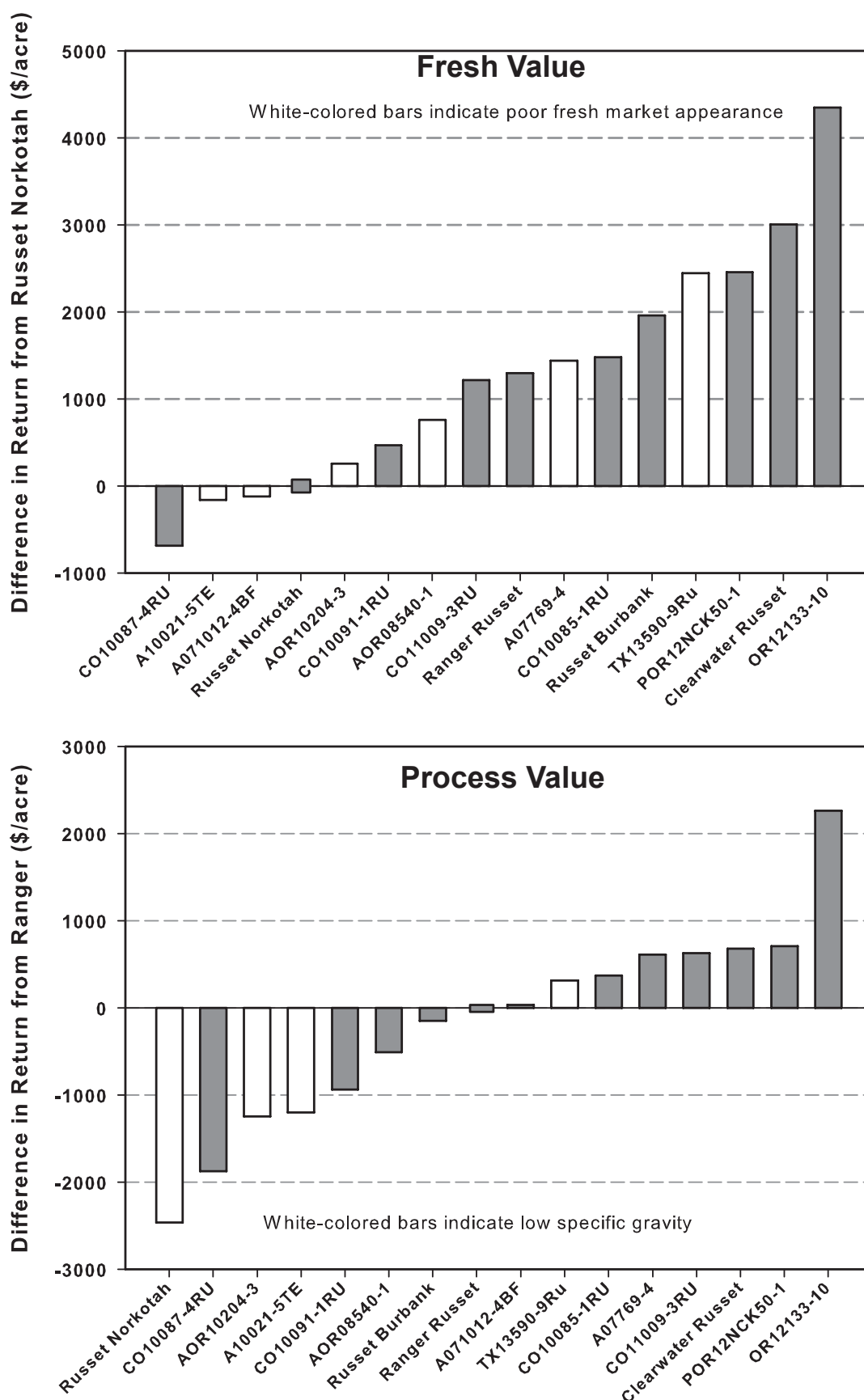
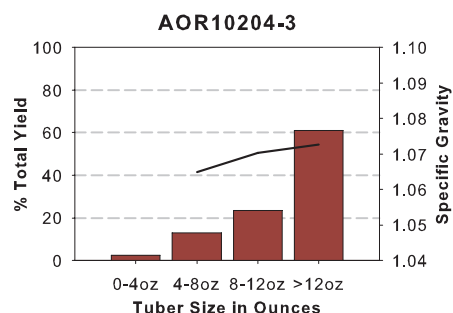
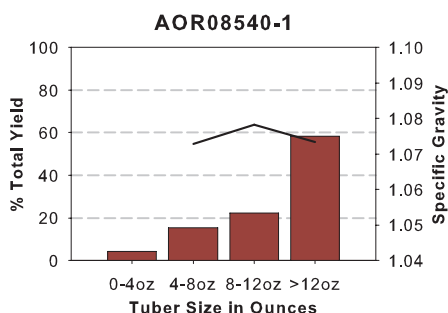
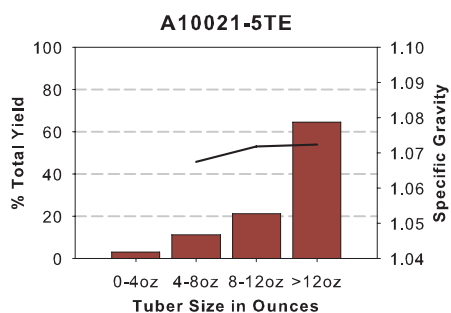
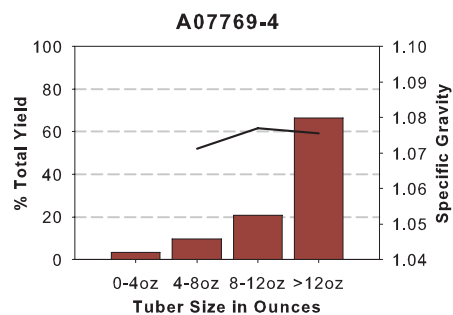
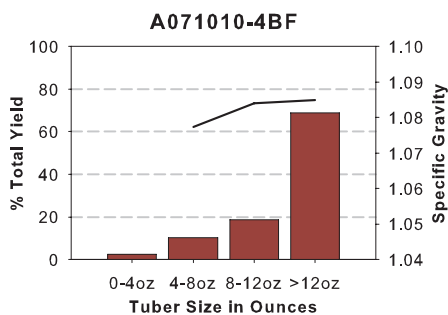
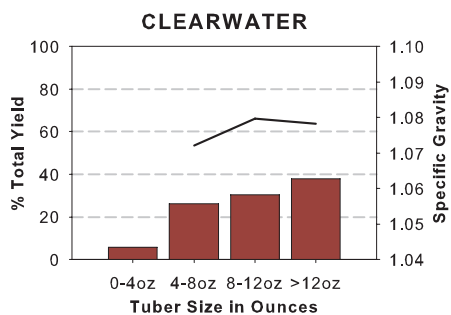
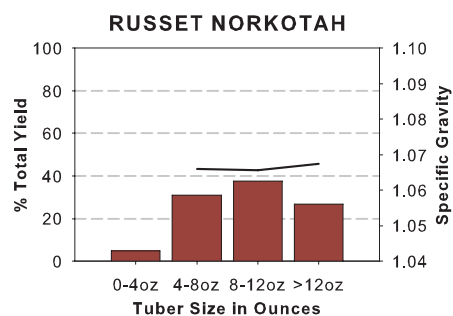
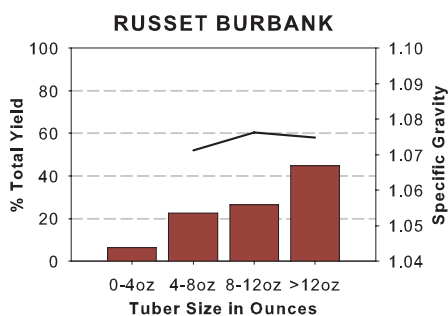
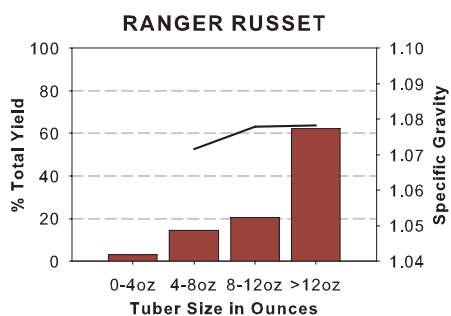
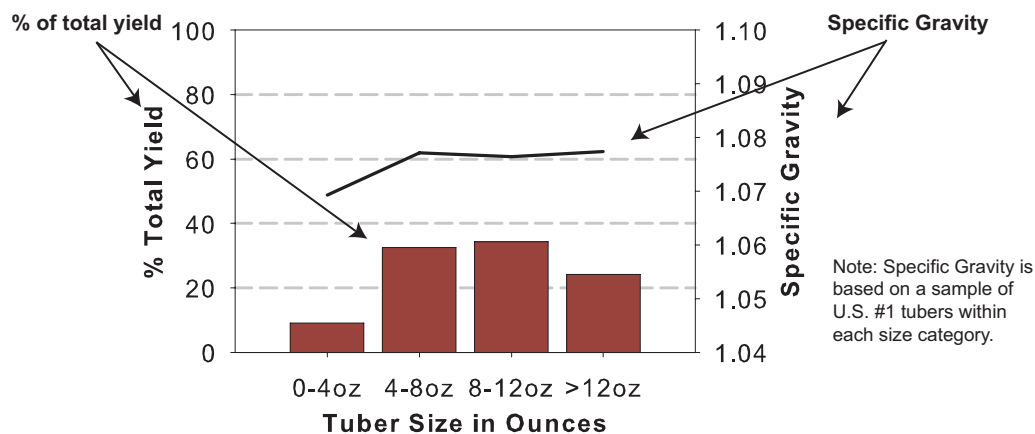


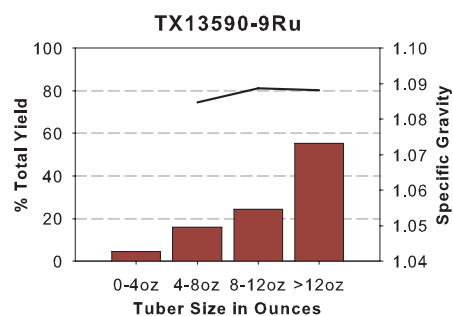
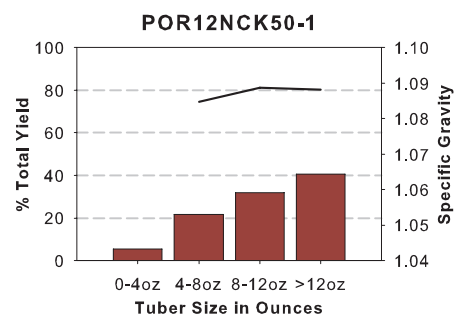
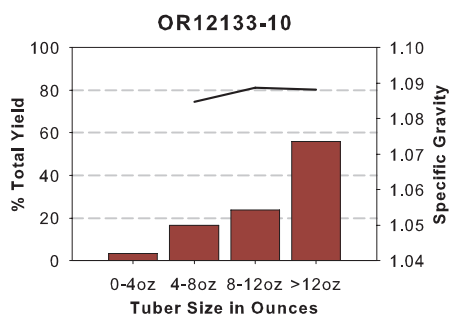
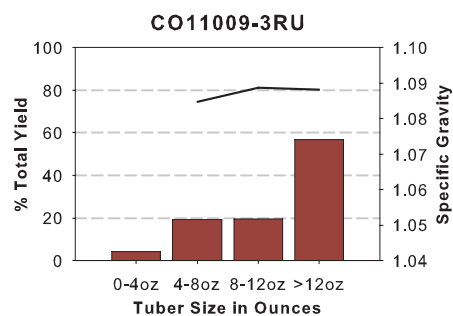
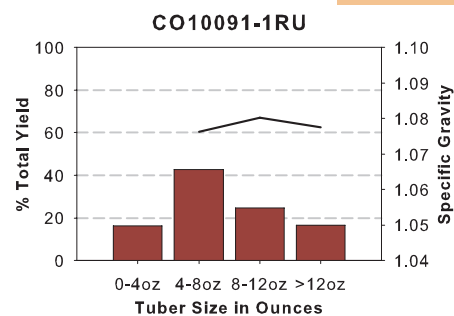
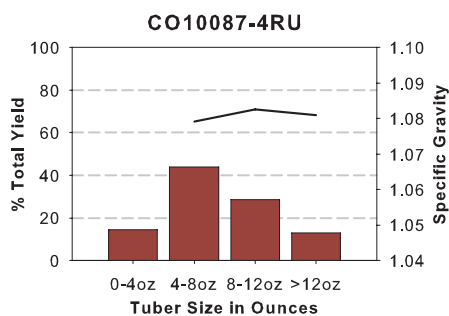
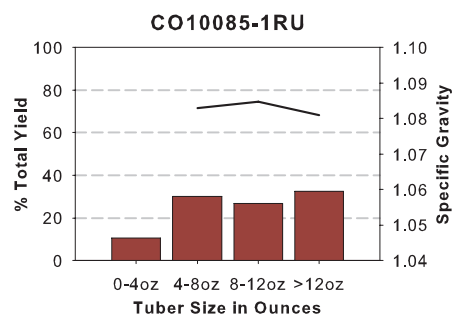
Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to the undesirable shape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

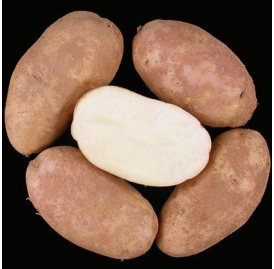
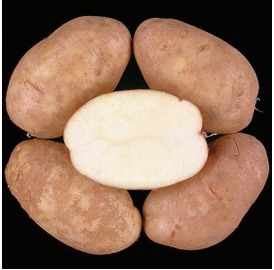
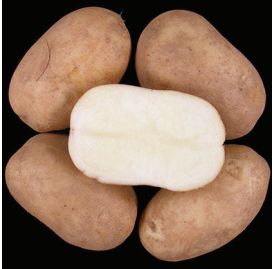
2020 Late Harvest Regional Trial

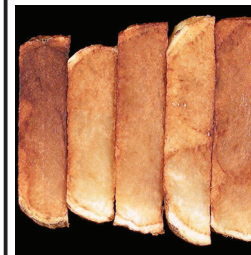
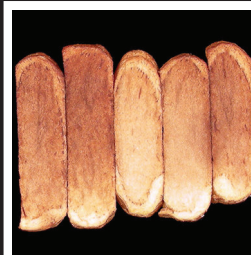
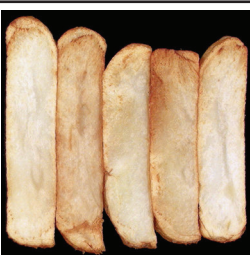
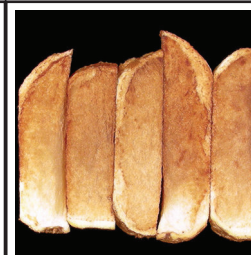
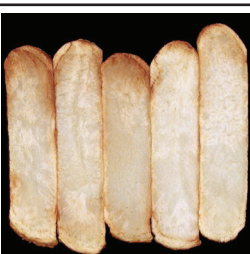
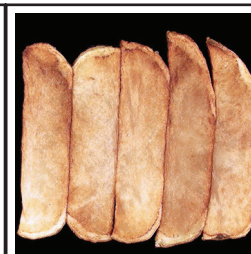
Tuber Yield and Specific Gravity Distributions

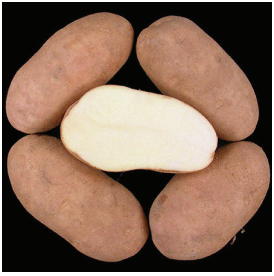
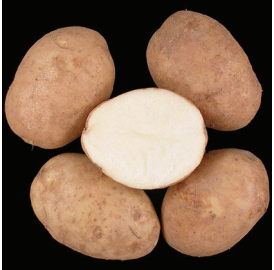
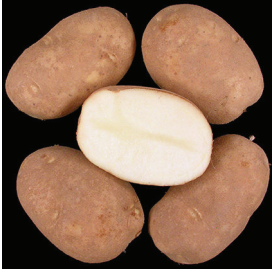
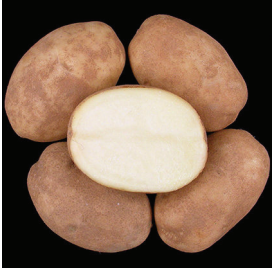
11 inch In-Row Spacing

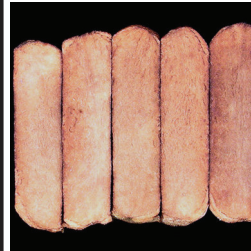
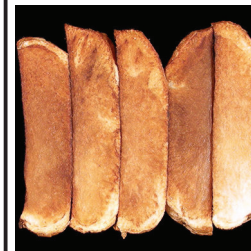
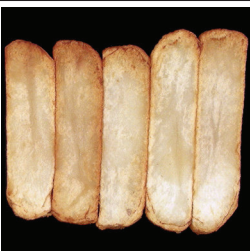
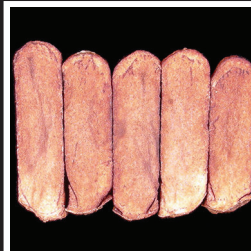
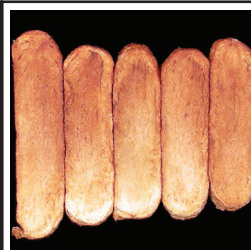
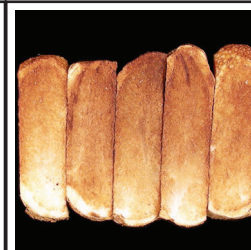
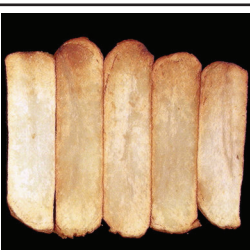


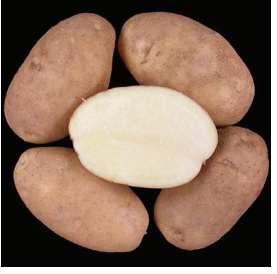


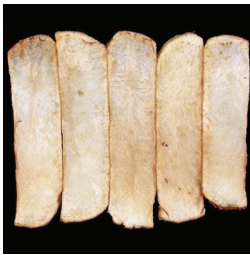
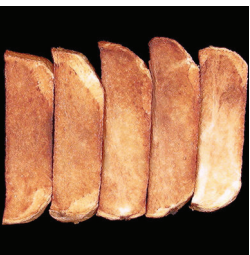
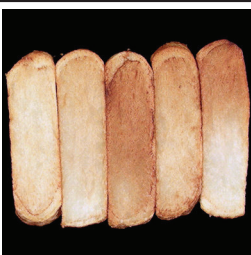
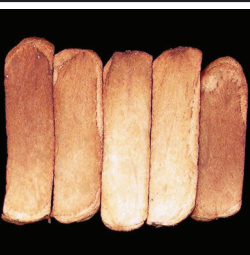
Tubers	WA Late Harvest Regional Trial Comments
Ranger Russet	
	Tubers: Oblong to long tubers. Good skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = relatively dark uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark non-uniform.
Russet Burbank	
	Tubers: Oblong tubers. Good skin set; moderate eye depth. Fry color: At harvest= light non-uniform; 48°F = relatively dark non-uniform; 44°F = relatively dark uniform; 40°F = unacceptably dark uniform; Reconditioned = unacceptably dark uniform.
Clearwater Russet	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light non-uniform; 44°F = light non-uniform; 40°F = relatively dark uniform; Reconditioned = light non-uniform.
A071012-4BF	
	Tubers: Oblong tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = light non-uniform; 44°F = relatively dark non-uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark non-uniform.
A07769-4	
	Tubers: Oblong tubers. Fair skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = light uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Recon.
Ranger Russet				
				
Russet Burbank				
				
Clearwater Russet				
				
A071012-4BF				
				
A07769-4				
				

Tubers	WA Late Harvest Regional Trial Comments
A10021-5TE	
	Tubers: Oblong to long tubers. Good skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = light uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark uniform.
AOR08540-1	
	Tubers: Oblong tubers. Good skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light uniform; 44°F = relatively dark uniform; 40°F = unacceptably dark uniform; Reconditioned = unacceptably dark uniform.
CO10085-1RU	
	Tubers: Oblong tubers. Good skin set; moderate eye depth. Fry color: At harvest= light uniform; 48°F = relatively dark non-uniform; 44°F = relatively dark non-uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark non-uniform.
CO10087-4RU	
	Tubers: Oblong to long 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 = relatively dark non-uniform.
CO10091-1RU	
	Tubers: Round to oblong tubers. Very good skin set; shallow eyes. Fry color: At harvest= light uniform; 48°F = light non-uniform; 44°F = light non-uniform; 40°F = unacceptably dark uniform; Reconditioned = relatively dark non-uniform.

Initial Fries	48° F Storage	44° F Storage	40° F Storage	40° F Recon.
A10021-5TE				
				
AOR08540-1				
				
CO10085-1RU				
				
CO10087-4RU				
				
CO10091-1RU				
				

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

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

2020 Late Harvest Regional Trial

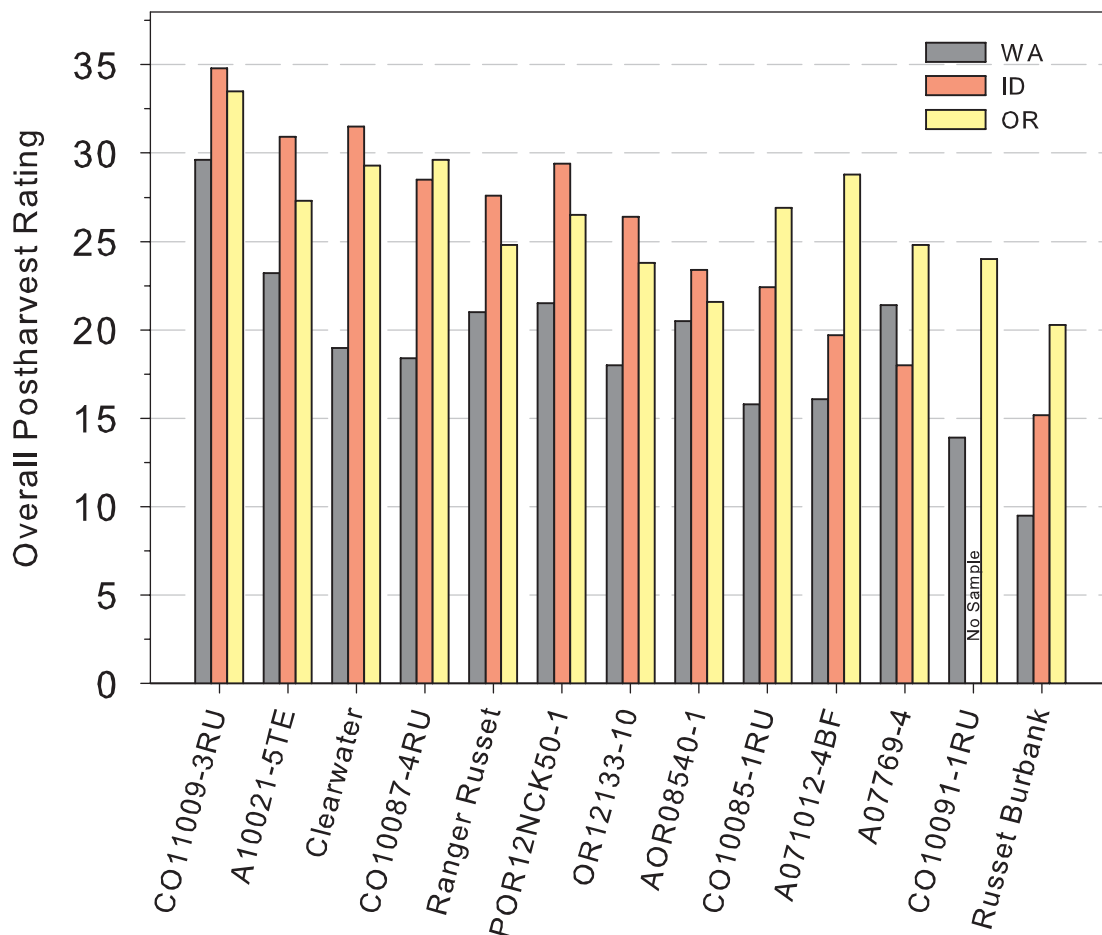
Accumulated Total Postharvest Ratings of Clones

Clone	WA		ID		OR		3 State av. Rating Total
	Rating Total §	Discard §§	Rating Total §	Discard §§	Rating Total §	Discard §§	
11 CO11009-3RU	29.6	40°F	34.8		33.5		32.6
6 A10021-5TE	23.2	SG, 40°F	30.9		27.3		27.1
3 Clearwater	19.0		31.5		29.3		26.6
9 CO10087-4RU	18.4		28.5		29.6	40°F	25.5
1 Ranger Russet	21.0	40°F	27.6		24.8	SG	24.5
13 POR12NCK50-1	21.5	40°F	29.4		26.5		24.0
12 OR12133-10	18.0	SG, 40°F	26.4		23.8	SG	22.7
7 AOR08540-1	20.5	SG, 40°F	23.4	40°F	21.6	SG, 40°F	21.8
8 CO10085-1RU	15.8	40°F	22.4		26.9	40°F	21.7
4 A071012-4BF	16.1	40°F	19.7	40°F	28.8		21.5
5 A07769-4	21.4	SG, 40°F	18.0	40°F	24.8	SG	21.4
10 CO10091-1RU	13.9	40°F	No Sample		24	SG	19.0
2 Russet Burbank	9.5	SG, 40°F	15.2	SG, 40°F	20.3	SG, 40°F	15.0
	19.1		25.7		26.2		23.3

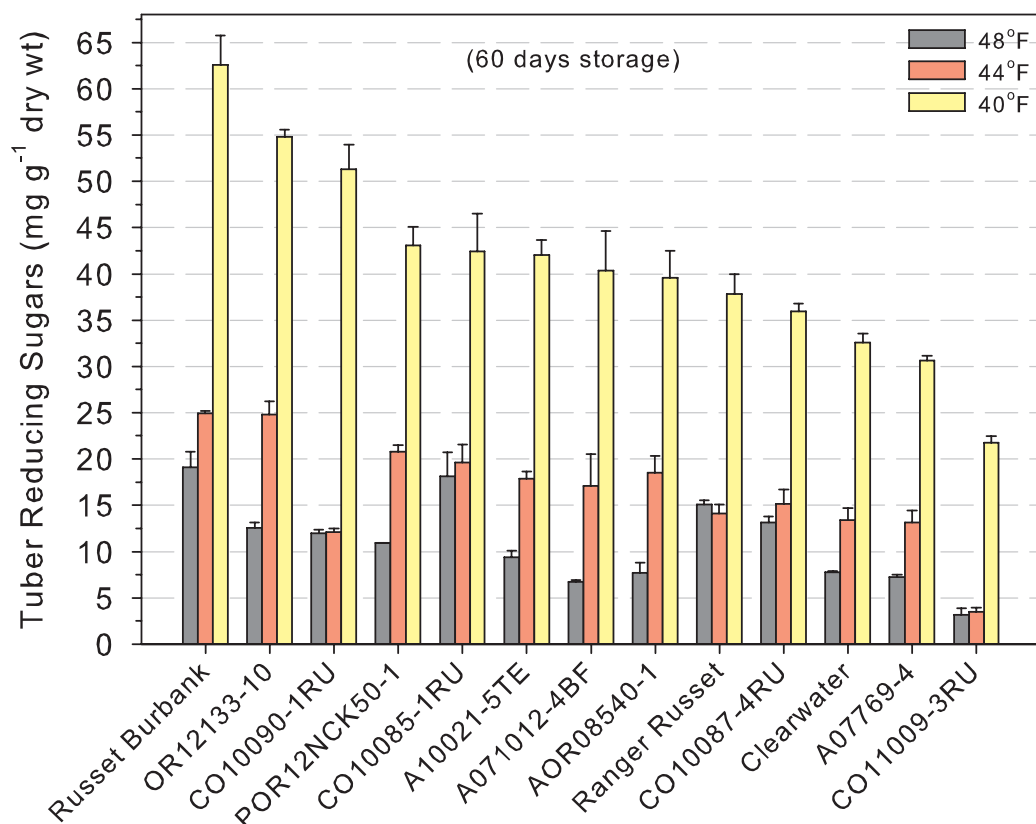
§ maximum rating possible = 38

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

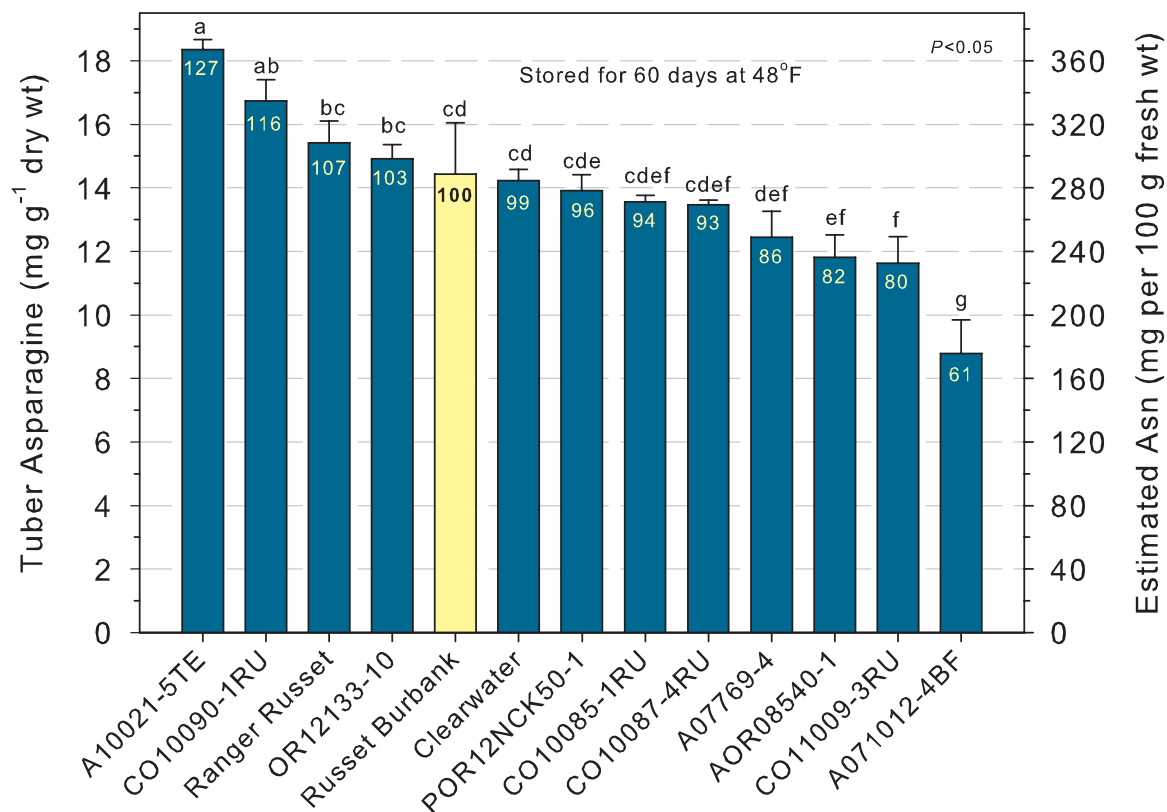
2020 Late Harvest Regional Trial Postharvest Ratings



2020 WA LRT Reducing Sugars



2020 WA LRT Tuber Asparagine Content



2020 Late Harvest Regional Trial

Prior to Storage

Clone	PHOTOVOLT READING					USDA COLOR	SPECIFIC GRAVITY	
	stem	bud	av	rtg §	DIFF		GRAVITY	rtg
Washington								
1 Ranger Russet	32.9	33.9	33.4	3+	3.2	0	1.078	2
2 Russet Burbank	22.7	33.4	28.1	2-	11.2	2	1.074	0
3 Clearwater	30.5	36.8	33.6	3+	6.7	0	1.079	2
4 A071012-4BF	31.5	38.0	34.8	3+	7.3	0	1.078	2
5 A07769-4	38.2	38.7	38.4	4+	3.1	0	1.073	0
6 A10021-5TE	41.1	38.0	39.5	4+	5.0	0	1.073	0
7 AOR08540-1	42.0	39.0	40.5	5+	3.8	0	1.074	0
8 CO10085-1RU	30.6	38.5	34.5	3+	7.9	0	1.081	4
9 CO10087-4RU	26.4	38.7	32.5	3-	12.2	1	1.081	4
10 CO10091-1RU	30.9	34.3	32.6	3+	4.0	0	1.076	1
11 CO11009-3RU	44.1	40.5	42.3	5+	5.8	0	1.083	5
12 OR12133-10	37.4	38.6	38.0	4+	3.3	0	1.072	0
13 POR12NCK50-1	43.6	46.1	44.8	5+	3.9	0	1.083	5
Average	LSD 0.05		3.5	3.3		0.006		
	34.8	38.0	36.4	6.0		0	1.077	
Idaho								
1 Ranger Russet	39.8	39.6	39.7	4+	3.3	0	1.092	3
2 Russet Burbank	34.8	38.5	36.7	4+	5.8	0	1.075	0
3 Clearwater	41.1	41.1	41.1	5+	5.1	0	1.090	4
4 A071012-4BF	44.1	42.8	43.4	5+	3.2	0	1.097	1
5 A07769-4	42.3	38.3	40.3	4+	5.1	0	1.097	1
6 A10021-5TE	51.8	49.2	50.5	5+	3.9	0	1.091	4
7 AOR08540-1	39.5	39.0	39.3	4+	2.5	0	1.090	4
8 CO10085-1RU	35.8	41.8	38.8	4+	6.2	0	1.090	4
9 CO10087-4RU	42.1	45.9	44.0	5+	4.2	0	1.091	4
10 CO10091-1RU	No Sample						No Sample	
11 CO11009-3RU	50.6	47.5	49.0	5+	3.6	0	1.092	3
12 OR12133-10	35.6	39.5	37.6	4+	6.4	0	1.085	5
13 POR12NCK50-1	47.9	49.4	48.6	5+	3.2	0	1.084	5
Average	LSD 0.05		2.3	2.3		0.005		
	42.1	42.7	42.4	4.4		0	1.089	
Oregon								
1 Ranger Russet	46.3	42.9	44.6	5+	4.9	0	1.072	0
2 Russet Burbank	40.7	40.6	40.7	5+	4.8	0	1.072	0
3 Clearwater	51.1	49.1	50.1	5+	3.9	0	1.076	1
4 A071012-4BF	46.1	44.9	45.5	5+	2.8	0	1.090	4
5 A07769-4	44.1	44.7	44.4	5+	3.5	0	1.070	0
6 A10021-5TE	52.2	49.1	50.7	5+	4.1	0	1.076	1
7 AOR08540-1	45.2	41.6	43.4	5+	4.4	0	1.068	0
8 CO10085-1RU	47.7	48.2	47.9	5+	2.1	0	1.080	3
9 CO10087-4RU	49.8	51.5	50.6	5+	2.5	0	1.082	4
10 CO10091-1RU	42.8	47.0	44.9	5+	4.3	0	1.071	0
11 CO11009-3RU	53.2	48.3	50.8	5+	4.9	0	1.080	3
12 OR12133-10	39.0	42.2	40.6	5+	4.4	0	1.066	0
13 POR12NCK50-1	50.7	49.3	50.0	5+	3.2	0	1.076	1
Average	LSD 0.05		2.1	2.4		0.006		
	46.8	46.1	46.5	3.8		0	1.075	

Date test performed:

Washington

Sept. 20

Sept. 17

Idaho

Sept. 26

Sept. 19

Oregon

Sept. 28

Sept. 26

§ 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.

2020 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 Ranger Russet	3.0	100	29	4.5	1.6	16	17
2 Russet Burbank	2.5	83	29	3.1	1.6	16	24
3 Clearwater	3.0	50	21	2.2	1.4	13	16
4 A071012-4BF	3.1	63	25	2.5	1.6	12	18
5 A07769-4	3.4	58	8	2.4	1.2	17	23
6 A10021-5TE	3.2	42	0	1.9	1.0	14	17
7 AOR08540-1	3.5	46	8	2.1	1.3	10	12
8 CO10085-1RU	2.8	54	29	2.3	1.7	16	14
9 CO10087-4RU	3.4	33	4	1.7	1.1	19	17
10 CO10091-1RU	2.9	25	0	1.5	1.0	13	8
11 CO11009-3RU	3.6	71	13	2.8	1.3	14	16
12 OR12133-10	3.0	88	21	3.1	1.4	21	13
13 POR12NCK50-1	3.5	46	21	1.9	1.4	12	16
LSD 0.05	0.4	29	23			7	8
Average	3.2	58.3	16.0	2.5	1.4	14.8	16.2
Idaho							
1 Ranger Russet	3.6	100	4	4.1	1.1	10	9
2 Russet Burbank	2.2	54	17	2.3	1.4	14	15
3 Clearwater	3.5	50	29	2.3	1.7	10	16
4 A071012-4BF	2.7	58	0	2.5	1.0	14	9
5 A07769-4	3.0	58	17	3.1	1.3	13	14
6 A10021-5TE	3.9	88	25	3.2	1.6	13	13
7 AOR08540-1	2.4	13	0	1.3	1.0	21	25
8 CO10085-1RU	2.4	50	13	2.0	1.3	11	10
9 CO10087-4RU	3.5	54	0	2.3	1.0	15	17
10 CO10091-1RU	No Sample	No Sample		No Sample		No Sample	
11 CO11009-3RU	3.8	42	4	1.9	1.1	11	14
12 OR12133-10	2.4	88	38	3.2	1.8	13	13
13 POR12NCK50-1	3.4	38	0	1.9	1.0	11	14
LSD 0.05	0.5	28	21			4	4
Average	3.1	57.6	12.2	2.5	1.3	12.9	14.2
Oregon							
1 Ranger Russet	2.8	92	13	3.7	1.3	11	12
2 Russet Burbank	2.3	50	4	2.5	1.1	11	15
3 Clearwater	3.3	4	13	1.1	1.3	11	14
4 A071012-4BF	2.8	92	8	3.5	1.2	13	14
5 A07769-4	2.8	8	0	1.3	1.0	15	12
6 A10021-5TE	3.3	17	4	1.4	1.1	14	12
7 AOR08540-1	2.6	21	13	1.5	1.3	13	14
8 CO10085-1RU	2.9	33	4	1.8	1.2	14	13
9 CO10087-4RU	3.6	21	13	1.5	1.3	12	11
10 CO10091-1RU	3.0	0	4	1.0	1.1	13	10
11 CO11009-3RU	3.5	21	4	1.5	1.1	14	13
12 OR12133-10	2.8	58	0	2.5	1.0	10	11
13 POR12NCK50-1	2.5	0	0	1.0	1.0	8	10
LSD 0.05	0.6	25	ns			4	4
Average	2.9	32.1	6.1	1.9	1.1	12.2	12.4

Date test performed:

Washington

Oct. 16

Oct. 24

Nov. 7

Idaho

Oct. 17

Oct. 26

Nov. 9

Oregon

Oct. 18

Oct. 30

Nov. 15

2020 Late Harvest Regional Trial

Stored at 48°F for 60 Days

	PHOTOVOLT READING				DIFF	USDA COLOR	% REDUCING SUGAR		SPROUTING	
	Clone	stem	bud	average			rtg §	stem	bud	(%)
Washington										
1 Ranger Russet	28.3	34.7	31.5	3+	6.5	1	1.6	1.0	27	0.25
2 Russet Burbank	16.7	28.8	22.8	1-	12.1	3	3.3	1.5	0	
3 Clearwater	31.6	41.8	36.7	4-	10.2	0	1.2	0.7	20	0.25
4 A071012-4BF	32.9	41.8	37.4	4-	9.5	0	1.1	0.7	7	0.75
5 A07769-4	34.6	37.7	36.2	4+	4.1	0	1.0	0.8	0	
6 A10021-5TE	43.6	44.9	44.3	5+	3.0	0	0.6	0.6	27	0.50
7 AOR08540-1	36.1	38.5	37.3	4+	5.8	0	0.9	0.8	0	
8 CO10085-1RU	21.2	37.4	29.3	2-	16.2	2	2.5	0.9	100	1.25
9 CO10087-4RU	28.6	39.4	34.0	3-	10.8	1	1.5	0.8	14	0.50
10 CO10091-1RU	28.9	39.8	34.3	3-	11.0	1	1.5	0.7	67	1.00
11 CO11009-3RU	42.3	44.7	43.5	5+	3.6	0	0.6	0.6	0	
12 OR12133-10	27.0	35.7	31.3	3+	8.9	1	1.7	1.0	100	1.75
13 POR12NCK50-1	28.4	39.6	34.0	3-	11.3	1	1.6	0.7	60	0.75
Average		LSD 0.05	3.3		3.6				19	
	30.8	38.8	34.8		8.7	1	1.5	0.8	32	
Idaho										
1 Ranger Russet	34.9	38.5	36.7	4+	4.0	0	1.0	0.8	40	0.25
2 Russet Burbank	28.5	38.1	33.3	3-	9.7	1	1.5	0.8	0	
3 Clearwater	40.7	45.3	43.0	5+	5.5	0	0.7	0.6	13	0.13
4 A071012-4BF	30.1	41.7	35.9	4-	11.6	1	1.4	0.7	0	
5 A07769-4	27.1	42.3	34.7	3-	15.3	1	1.7	0.6	20	0.13
6 A10021-5TE	44.5	43.3	43.9	5+	4.7	0	0.6	0.6	60	0.25
7 AOR08540-1	32.7	35.0	33.9	3+	4.2	0	1.2	1.0	0	
8 CO10085-1RU	29.9	42.7	36.3	4-	12.8	1	1.4	0.6	60	0.13
9 CO10087-4RU	36.2	41.5	38.9	4+	5.4	0	0.9	0.7	53	0.13
10 CO10091-1RU			No Sample				No Sample		No Sample	
11 CO11009-3RU	49.7	46.0	47.9	5+	3.8	0	0.5	0.5	20	0.13
12 OR12133-10	32.2	39.5	35.8	4+	7.3	0	1.2	0.8	100	0.50
13 POR12NCK50-1	44.9	47.7	46.3	5+	4.3	0	0.6	0.5	13	0.13
Average		LSD 0.05	2.9		3.1				21	
	35.9	41.8	38.9		7.4	0	1.1	0.7	32	
Oregon										
1 Ranger Russet	40.5	39.3	39.9	4+	3.6	0	0.7	0.8	67	0.50
2 Russet Burbank	31.4	33.1	32.3	3+	2.8	0	1.3	1.1	0	
3 Clearwater	40.2	42.9	41.5	5+	3.7	0	0.7	0.6	80	0.13
4 A071012-4BF	36.8	38.7	37.7	4+	4.2	0	0.9	0.8	87	0.13
5 A07769-4	41.8	41.9	41.8	5+	3.4	0	0.7	0.7	93	0.50
6 A10021-5TE	47.4	44.4	45.9	5+	4.3	0	0.5	0.6	67	0.13
7 AOR08540-1	36.6	35.1	35.8	4+	4.3	0	0.9	1.0	40	0.13
8 CO10085-1RU	47.8	47.3	47.5	5+	4.0	0	0.5	0.5	87	2.00
9 CO10087-4RU	46.2	48.1	47.2	5+	3.8	0	0.5	0.5	87	0.75
10 CO10091-1RU	43.7	44.8	44.2	5+	5.5	0	0.6	0.6	100	0.75
11 CO11009-3RU	52.4	46.9	49.6	5+	5.5	0	0.5	0.5	47	0.13
12 OR12133-10	38.2	41.8	40.0	4+	4.9	0	0.8	0.7	100	3.00
13 POR12NCK50-1	47.4	47.1	47.2	5+	3.7	0	0.5	0.5	87	0.50
Average		LSD 0.05	2.8		2.7				20	
	42.3	42.4	42.4		4.1	0	0.7	0.7	72	

Date test performed:

Washington

Nov. 29

Nov. 29

Dec. 15

Idaho

Dec. 5

Dec. 5

Dec. 15

Oregon

Dec. 10

Dec. 10

Dec. 15

§ 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.

2020 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 Ranger Russet	24.7	32.9	28.8	2+	8.2	1	2.0	1.1
2 Russet Burbank	16.7	24.8	20.7	1+	8.1	3	3.3	2.0
3 Clearwater	27.0	36.9	31.9	3-	9.9	1	1.7	0.9
4 A071012-4BF	21.7	36.5	29.1	2-	14.8	2	2.4	0.9
5 A07769-4	28.4	34.7	31.6	3+	6.7	1	1.5	1.0
6 A10021-5TE	29.8	34.1	32.0	3+	5.2	1	1.4	1.1
7 AOR08540-1	25.6	30.3	28.0	2+	5.3	1	1.9	1.4
8 CO10085-1RU	18.8	31.1	25.0	2-	12.4	3	2.9	1.3
9 CO10087-4RU	25.9	38.1	32.0	3-	12.2	1	1.8	0.8
10 CO10091-1RU	27.9	35.3	31.6	3-	11.6	1	1.6	1.0
11 CO11009-3RU	41.4	41.4	41.4	5+	2.6	0	0.7	0.7
12 OR12133-10	20.9	28.7	24.8	2+	7.7	2	2.5	1.5
13 POR12NCK50-1	21.7	31.9	26.8	2-	10.2	2	2.4	1.2
Average	25.4	LSD 0.05 33.6	3.5 29.5		3.9 8.8	1	2.0	1.1
Idaho								
1 Ranger Russet	30.9	37.6	34.2	3+	7.6	0	1.3	0.8
2 Russet Burbank	22.3	35.6	29.0	2-	13.6	2	2.3	1.0
3 Clearwater	33.9	42.3	38.1	4+	8.4	0	1.1	0.6
4 A071012-4BF	23.1	40.2	31.6	3-	17.0	2	2.2	0.7
5 A07769-4	23.8	38.2	31.0	3-	15.2	2	2.1	0.8
6 A10021-5TE	38.7	40.8	39.8	4+	3.6	0	0.8	0.7
7 AOR08540-1	23.1	31.7	27.4	2+	8.6	2	2.2	1.2
8 CO10085-1RU	26.0	38.4	32.2	3-	12.4	1	1.8	0.8
9 CO10087-4RU	32.3	36.5	34.4	3+	4.9	0	1.2	0.9
10 CO10091-1RU	No Sample						No Sample	
11 CO11009-3RU	47.2	48.3	47.8	5+	1.6	0	0.5	0.5
12 OR12133-10	30.8	34.0	32.4	3+	5.1	0	1.3	1.1
13 POR12NCK50-1	33.7	44.0	38.8	4-	10.4	0	1.1	0.6
Average	30.5	LSD 0.05 39.0	2.7 34.7		3.6 9.0	1	1.5	0.8
Oregon								
1 Ranger Russet	36.1	39.7	37.9	4+	5.6	0	0.9	0.7
2 Russet Burbank	26.6	32.5	29.6	2+	6.4	1	1.8	1.2
3 Clearwater	43.8	43.6	43.7	5+	3.7	0	0.6	0.6
4 A071012-4BF	33.5	39.7	36.6	4+	7.0	0	1.1	0.7
5 A07769-4	38.2	38.1	38.2	4+	2.5	0	0.8	0.8
6 A10021-5TE	38.9	39.2	39.0	4+	3.4	0	0.8	0.8
7 AOR08540-1	27.5	33.7	30.6	3+	6.5	1	1.6	1.1
8 CO10085-1RU	39.7	43.1	41.4	5+	5.8	0	0.7	0.6
9 CO10087-4RU	40.9	45.5	43.2	5+	4.9	0	0.7	0.6
10 CO10091-1RU	34.3	41.1	37.7	4+	7.0	0	1.0	0.7
11 CO11009-3RU	52.5	47.7	50.1	5+	7.0	0	0.5	0.5
12 OR12133-10	36.6	41.3	38.9	4+	4.9	0	0.9	0.7
13 POR12NCK50-1	43.5	45.2	44.3	5+	2.5	0	0.6	0.6
Average	37.8	LSD 0.05 40.8	3.7 39.3		3.1 5.2	0	0.9	0.7

Date test performed:

Washington

Nov. 30

Nov. 30

Idaho

Dec. 6

Dec. 6

Oregon

Dec. 12

Dec. 12

§ 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.

2020 Late Harvest Regional Trial

Stored at 40°F for 60 Days and Reconditioned

PHOTOVOLT(60 Days at 40°F)								PHOTOVOLT AFTER RECONDITIONING					
SPROUTING								USDA		(21 days at 60°F)			USDA
Clone	(%)	stem	bud	average	rtg	\$	DIFF	COLOR	stem	bud	average	DIFF	COLOR
Washington													
1 Ranger Russet	0	13.6	22.1	17.8	0	8.6	4		23.2	31.8	27.5	9.9	2
2 Russet Burbank	0	8.7	12.5	10.6	0	3.8	4		15.0	23.2	19.1	8.6	3
3 Clearwater	0	15.7	24.4	20.0	1	8.7	3		24.0	37.1	30.5	13.0	2
4 A071012-4BF	0	12.8	19.3	16.1	0	7.0	4		22.4	33.5	27.9	11.0	2
5 A07769-4	0	14.9	20.8	17.8	0	5.9	3		22.9	29.4	26.1	7.8	2
6 A10021-5TE	0	13.1	17.0	15.0	0	3.9	4		20.2	25.0	22.6	5.2	2
7 AOR08540-1	0	13.4	19.3	16.3	0	6.1	4		17.1	19.4	18.2	4.0	3
8 CO10085-1RU	0	10.6	12.3	11.4	0	2.4	4		21.5	34.5	28.0	13.1	2
9 CO10087-4RU	0	15.2	26.7	20.9	1	11.6	3		18.3	28.8	23.5	10.5	3
10 CO10091-1RU	0	11.2	16.2	13.7	0	5.1	4		22.4	33.4	27.9	11.0	2
11 CO11009-3RU	0	17.2	20.0	18.6	0	4.3	3		33.5	38.5	36.0	5.3	0
12 OR12133-10	0	11.5	15.3	13.4	0	3.8	4		17.5	24.7	21.1	7.2	3
13 POR12NCK50-1	0	13.3	18.3	15.8	0	5.1	4		23.2	31.0	27.1	8.2	2
LSD 0.05	ns			2.2		2.7					3.7	4.1	
Average	0	13.1	18.8	16.0		5.9	4		21.6	30.0	25.8	8.8	2.2
Idaho													
1 Ranger Russet	0	18.3	31.7	25.0	2	13.4	3		25.9	37.0	31.4	11.6	1
2 Russet Burbank	0	12.2	19.1	15.7	0	7.4	4		20.9	33.7	27.3	12.8	2
3 Clearwater	0	21.3	32.7	27.0	2	11.4	2		28.6	42.4	35.5	14.0	1
4 A071012-4BF	0	14.9	20.7	17.8	0	5.8	3		18.9	31.6	25.3	12.8	3
5 A07769-4	0	15.3	20.9	18.1	0	5.6	3		23.2	30.5	26.8	7.3	2
6 A10021-5TE	0	23.1	25.0	24.1	1	3.6	2		25.0	32.5	28.7	7.5	1
7 AOR08540-1	0	11.6	14.8	13.2	0	3.5	4		18.5	25.6	22.1	7.3	3
8 CO10085-1RU	0	16.2	27.3	21.7	1	11.1	3		24.0	38.1	31.0	14.1	2
9 CO10087-4RU	0	15.8	26.1	21.0	1	10.4	3		20.1	29.6	24.9	9.5	2
10 CO10091-1RU		No Sample							No Sample				
11 CO11009-3RU	0	39.3	43.5	41.4	5	4.3	0		41.1	46.9	44.0	6.3	0
12 OR12133-10	0	16.5	22.8	19.7	1	6.3	3		20.4	35.9	28.2	15.5	2
13 POR12NCK50-1	0	20.4	26.2	23.3	1	5.9	2		24.1	33.5	28.8	9.4	2
LSD 0.05	ns			2.5		3.3					3.3	5.0	
Average	0	18.7	25.9	22.3		7.4	3		24.2	34.8	29.5	10.7	2
Oregon													
Oregon samples were held at 40 for 57 days													
1 Ranger Russet	0	16.6	23.1	19.9	1	7.1	3		17.0	30.5	23.8	13.5	3
2 Russet Burbank	0	15.7	20.7	18.2	0	5.9	3		15.7	19.5	17.6	4.2	3
3 Clearwater	0	34.6	39.5	37.1	4	6.5	0		28.2	38.2	33.2	10.0	1
4 A071012-4BF	0	32.4	19.5	25.9	2	17.6	0		22.1	30.6	26.3	9.1	2
5 A07769-4	0	28.0	25.9	27.0	2	2.8	1		26.2	30.2	28.2	6.1	1
6 A10021-5TE	0	22.7	23.9	23.3	1	4.0	2		23.0	26.2	24.6	3.4	2
7 AOR08540-1	0	11.6	16.2	13.9	0	4.6	4		15.4	23.4	19.4	8.0	3
8 CO10085-1RU	7	16.8	18.9	17.9	0	2.7	3		31.3	44.1	37.7	12.8	0
9 CO10087-4RU	0	16.5	21.7	19.1	0	5.2	3		19.5	29.4	24.4	10.1	2
10 CO10091-1RU	0	22.4	31.0	26.7	2	8.6	2		23.5	35.8	29.7	12.2	2
11 CO11009-3RU	0	44.7	43.7	44.2	5	2.5	0		41.6	45.6	43.6	4.5	0
12 OR12133-10	0	21.3	26.1	23.7	1	5.8	2		23.2	36.5	29.8	13.2	2
13 POR12NCK50-1	0	22.1	25.3	23.7	1	4.6	2		25.5	34.8	30.2	9.4	1
LSD 0.05	5			6.4		11.4					3.6	4.2	
Average	1	23.5	25.8	24.7		6.0	2		24.0	32.7	28.3	9.0	1.7

Date test performed:

Washington Dec. 10
Idaho Dec. 10
Oregon Dec. 10

Dec. 1
 Dec. 7
 Dec. 13

Dec. 13
 Dec. 14
 Dec. 14

DIFF = Absolute difference between bud and stem Photovolt reading.

Entries Retained from the 2019 Trials Currently in the Regional Trial

Harvested fall of 2019

Held at 48°F until December 13

Stored at 44°F until analysis

There were no clones advanced from the 2019 Tri-State Trial into the 2020 Regional Trial. Seven clones were retained in the Regional Trial. Fries from A07769-4 were often mottled or very dark in the mid-section. Therefore, Photovolt readings were taken from the mid-section instead of the stem ends (WA and OR samples) to document this disorder. When averaged across states, A10021-5TE produced the lightest fries (46.1 ref units), which is consistent with the long term storage results from the past two years. A10021-5TE and POR12NCK50-1 were the only two entries to produce uniform fry color (stem to bud Photovolt difference) for samples grown from all three states. Sprout lengths ranged from 0.5 to 2.5 inches depending on clone and state. POR12NCK50-1 produced the longest sprouts (avg = 2.2 inches) indicating short dormancy.

		PHOTOVOLT READING				USDA	% REDUCING SUGAR			Sprouting	
Clone		stem	bud	avg	DIFF	COLOR	stem	bud	avg	percent	length (in.)
Washington											
1 Ranger Russet		30.6	37.7	34.2	7.2	0	1.3	0.8	1.1	100	1.5
2 Russet Burbank		24.9	36.9	30.9	12.0	1	2.0	0.9	1.4	100	1.5
3 A071012-4BF		22.2	33.4	27.8	11.2	2	2.3	1.1	1.7	100	0.8
4 A07769-4		15.8	30.9	23.3	15.2	3	3.5	1.3	2.4	100	0.5
5 A10021-5TE		43.8	46.0	44.9	3.4	0	0.6	0.5	0.6	100	0.8
6 CO10087-4RU		36.4	46.0	41.2	9.7	0	0.9	0.5	0.7	100	0.5
7 CO10091-1RU		32.0	42.1	37.0	10.0	0	1.2	0.7	0.9	100	0.5
8 OR12133-10		23.3	38.2	30.7	14.9	2	2.2	0.8	1.5	100	0.5
9 POR12NCK50-1		34.9	43.5	39.2	8.6	0	1.0	0.6	0.8	100	2.0
Average		LSD 0.05		3.2	4.6						
		29.3	39.4	34.4	10.2	1	1.7	0.8	1.2	100	
Idaho											
1 Ranger Russet		31.3	36	33.7	5.5	0	1.3	0.9	1.1	100	1.3
2 Russet Burbank		31.3	42.5	36.9	11.7	0	1.3	0.6	1.0	100	2.0
3 A071012-4BF		32.8	37.6	35.2	5.0	0	1.1	0.8	1.0	100	1.5
4 A07769-4		40.9	42.1	41.5	5.1	0	0.7	0.6	0.7	100	1.5
5 A10021-5TE		44.4	47.6	46.0	5.2	0	0.6	0.5	0.6	100	2.0
6 CO10087-4RU		43.9	47.9	45.9	4.1	0	0.6	0.5	0.6	100	1.0
7 CO10091-1RU		No Sample					No Sample				
8 OR12133-10		35.3	40.5	37.9	5.4	0	1.0	0.7	0.8	100	2.0
9 POR12NCK50-1		37.1	37.0	37.0	5.0	0	0.9	0.9	0.9	100	2.5
Average		LSD 0.05		3.6	3.3						
		37.2	41.4	39.3	5.9	0	0.9	0.7	0.8	100	
Oregon											
1 Ranger Russet		32.8	33.3	33.0	7.0	0	1.1	1.1	1.1	100	1.5
2 Russet Burbank		26.8	37.1	32.0	10.3	1	1.7	0.9	1.3	100	1.5
3 A071012-4BF		22.6	39.2	30.9	16.6	2	2.3	0.8	1.5	100	0.8
4 A07769-4		12.1	20.6	16.3	8.5	4	4.5	2.6	3.5	100	1.5
5 A10021-5TE		48.7	45.8	47.3	3.5	0	0.5	0.6	0.5	100	0.5
6 CO10087-4RU		46.6	50.0	48.3	3.9	0	0.5	0.5	0.5	100	1.5
7 CO10091-1RU		40.2	43.3	41.8	3.6	0	0.7	0.6	0.7	100	1.0
8 OR12133-10		28.2	38.5	33.4	11.3	1	1.6	0.8	1.2	100	1.0
9 POR12NCK50-1		42.3	46.5	44.4	6.3	0	0.6	0.5	0.6	100	2.0
Average		LSD 0.05		3.4	4.5						
		33.4	39.4	36.4	7.9	1	1.5	0.9	1.2	100	

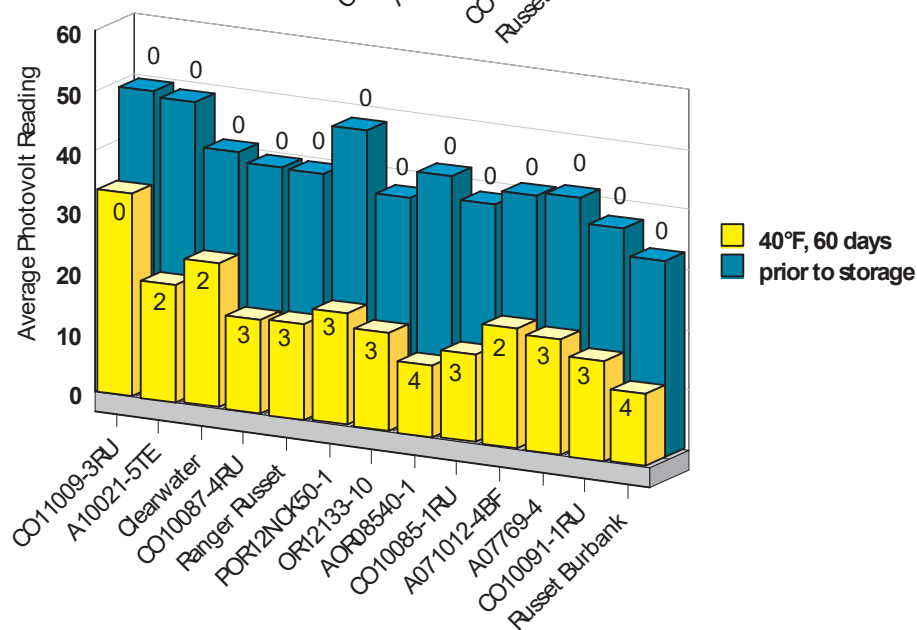
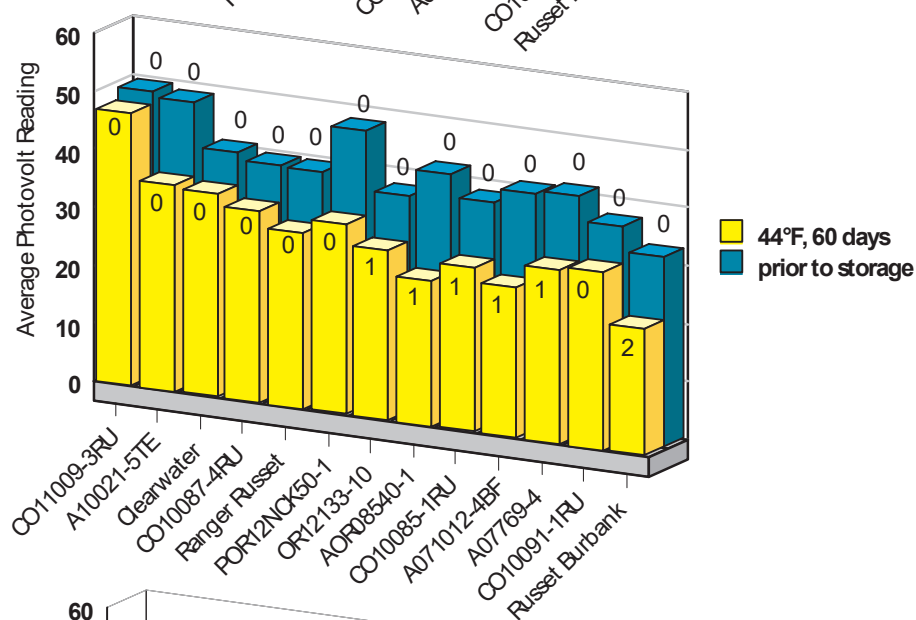
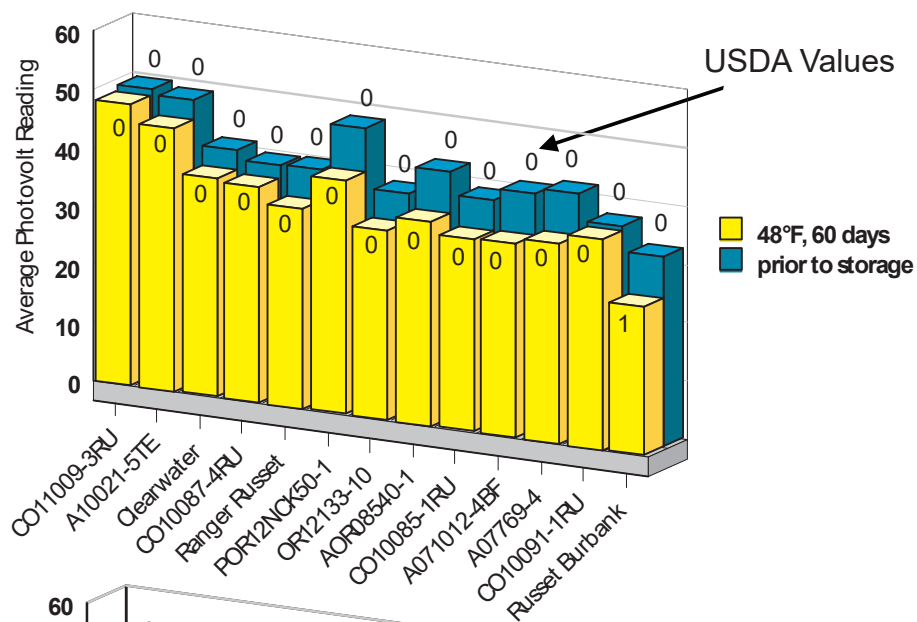
Date test performed:

Washington April 28**Idaho** April 29**Oregon** April 30

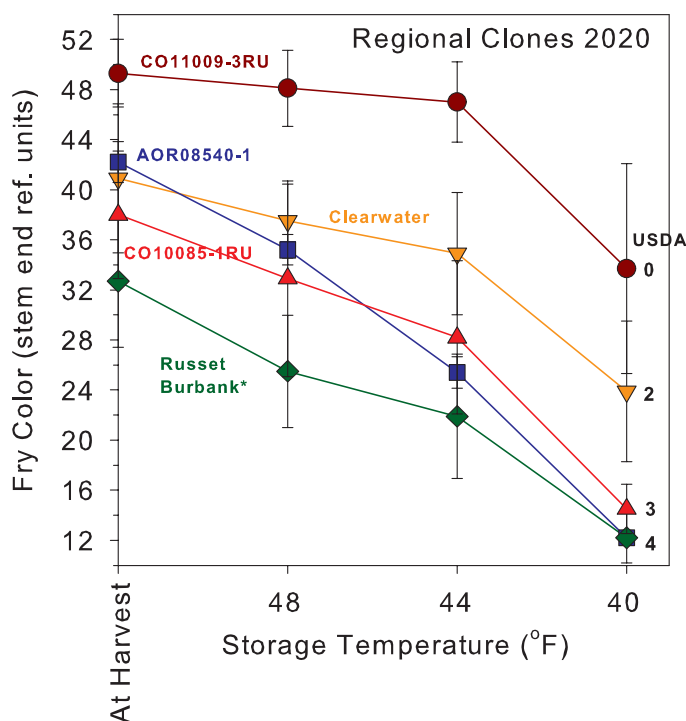
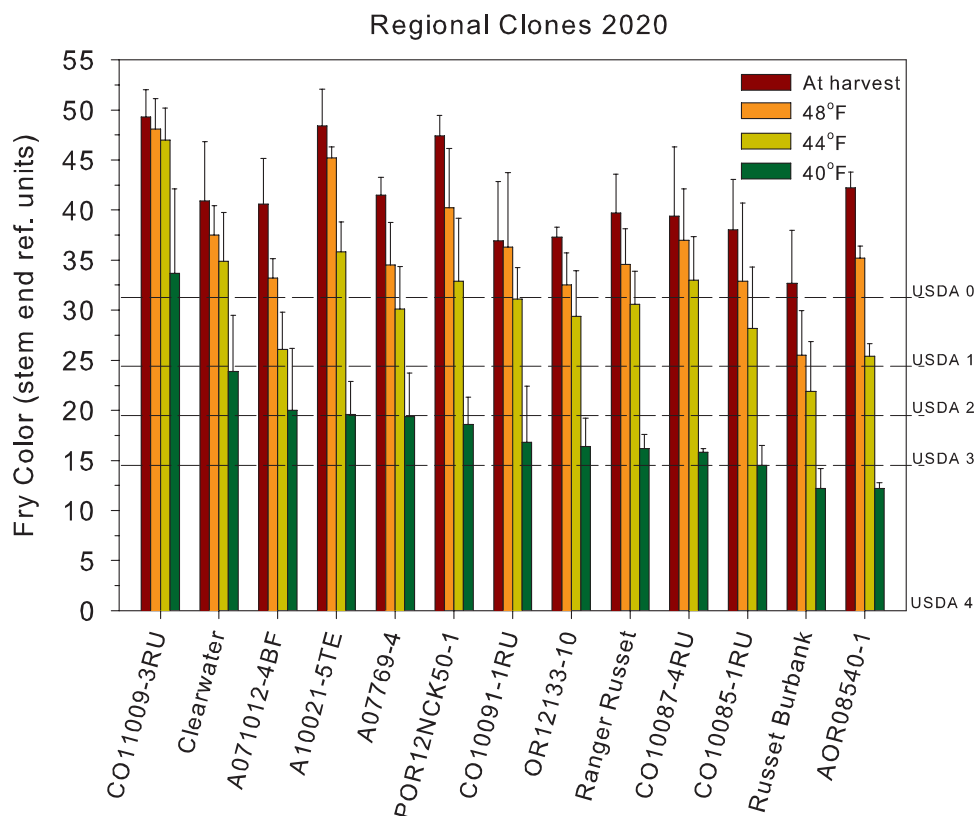
§ Advanced from 2019 Tri-State Trial.

Regional Trial - 3 State Average of Stem End

2020 Late Harvest Regional Trial



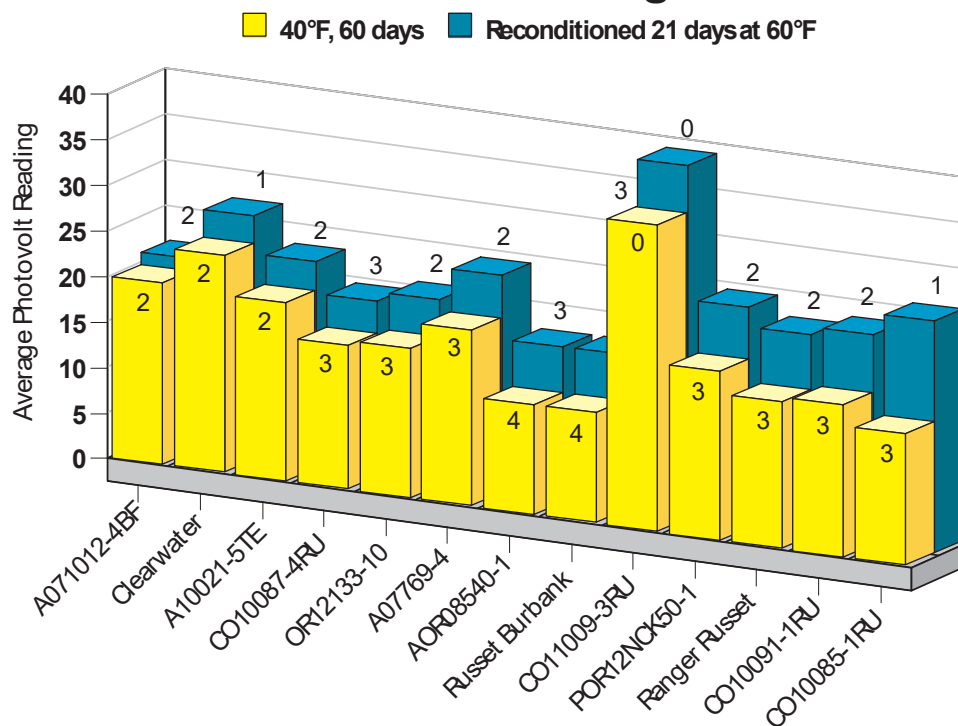
2020 Late Harvest Regional Trial



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.

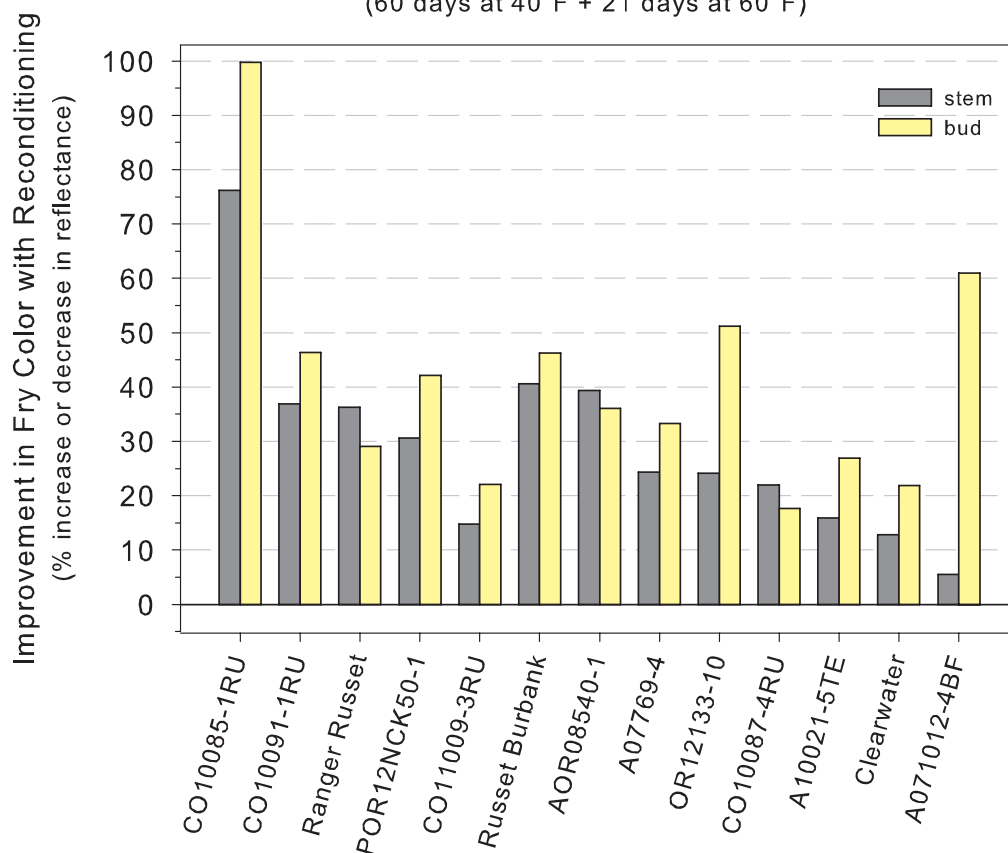
Bottom: Line graph depicting the effects of storage temperature on change in French fry processing quality (stem end fry color) of the most cold sweetening resistant (CO11009-3RU, Clearwater Russet, and CO10085-1RU) and susceptible (Russet Burbank and AOR08540-1) clones in the Regional Trial. *Indicates similar performance of the clones last year.

2020 Late Harvest Regional Trial



Regional Clones 2020

(60 days at 40°F + 21 days at 60°F)



Reconditioning abilities of clones in the 2020 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. Numbers in bars indicate the USDA color rating of the stem end. **Bottom:** Percent improvement of stem and bud end fry color with reconditioning.

2020 Late Harvest Regional Trial

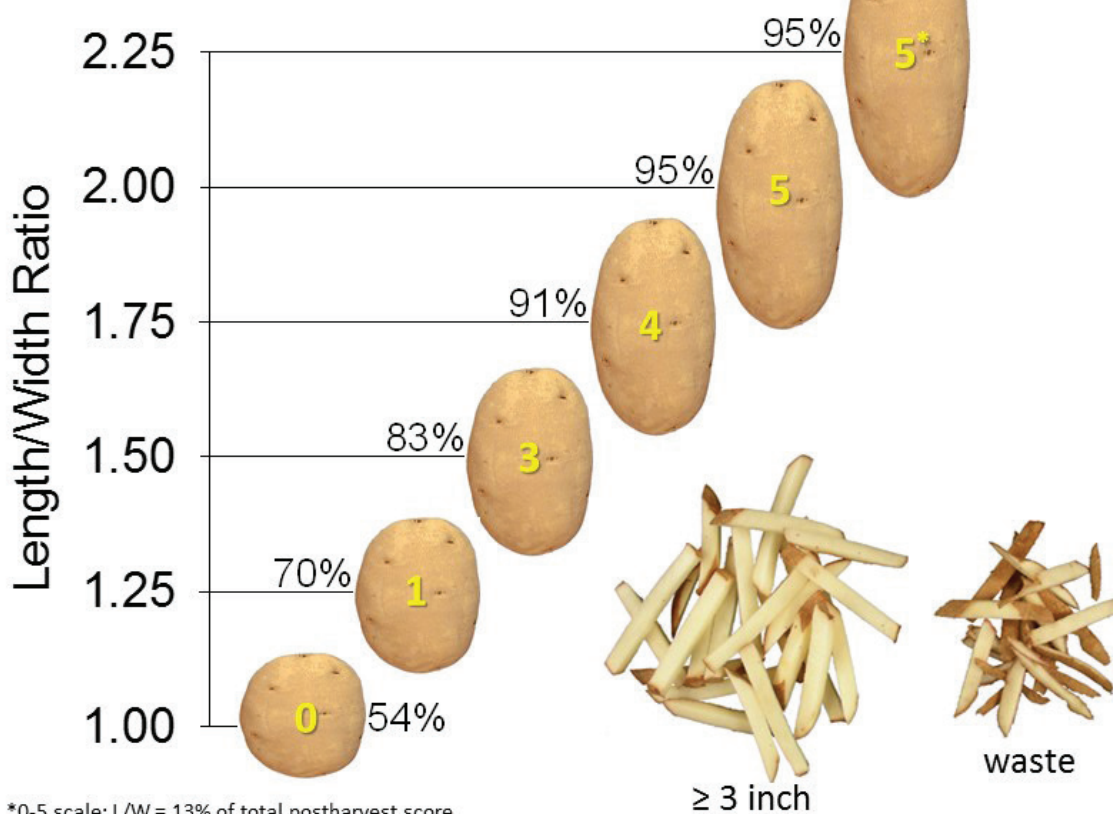
Length to Width Ratios of 8-10 oz Tubers

Clone	Length to width ratio						3 State Avg.
	WA	rtg §	ID	rtg §	OR	rtg §	
1 Ranger Russet	1.85	5	2.22	5	2.02	5	2.03
2 Russet Burbank	1.74	4	2.19	5	1.93	5	1.95
3 Clearwater	1.65	4	1.85	5	1.61	3	1.70
4 A071012-4BF	1.64	3	1.93	5	1.65	4	1.74
5 A07769-4	1.65	4	1.87	5	1.53	3	1.68
6 A10021-5TE	1.91	5	2.23	5	1.83	5	1.99
7 AOR08540-1	1.51	3	1.98	5	1.79	4	1.76
8 CO10085-1RU	1.53	3	2.15	5	1.52	3	1.73
9 CO10087-4RU	1.78	4	1.90	5	1.76	4	1.81
10 CO10091-1RU	1.48	2	No Sample		1.46	2	1.47
11 CO11009-3RU	1.61	3	1.93	5	1.68	4	1.74
12 OR12133-10	1.60	3	1.78	4	1.68	4	1.69
13 POR12NCK50-1	1.76	4	1.89	5	1.68	4	1.78
Average	1.67		1.99		1.70		1.78

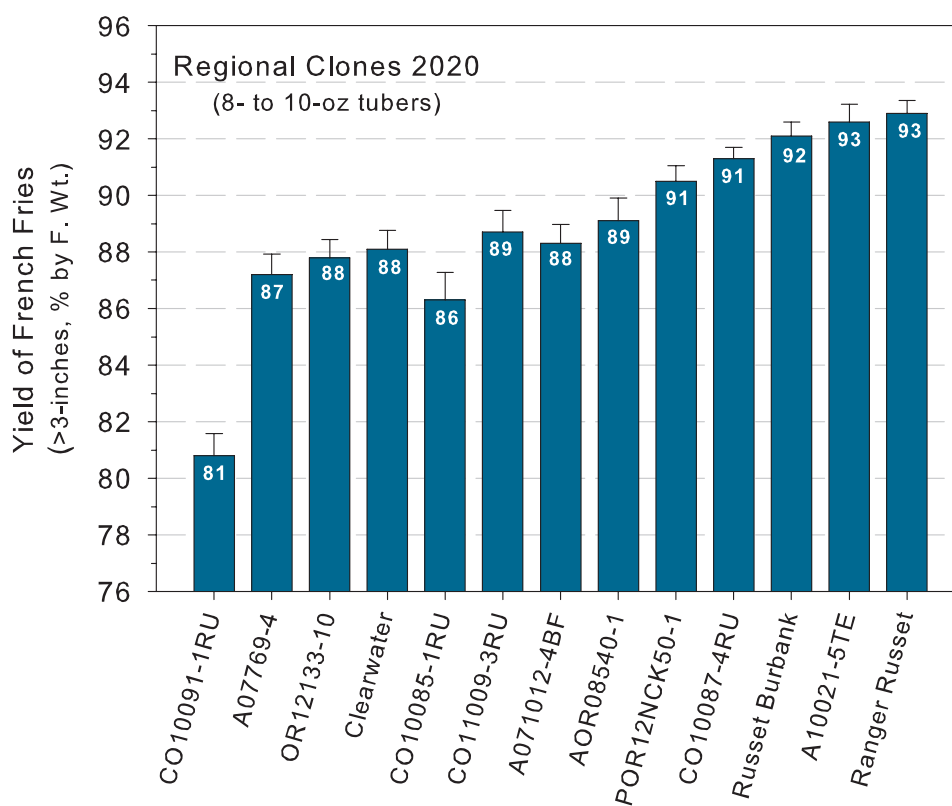
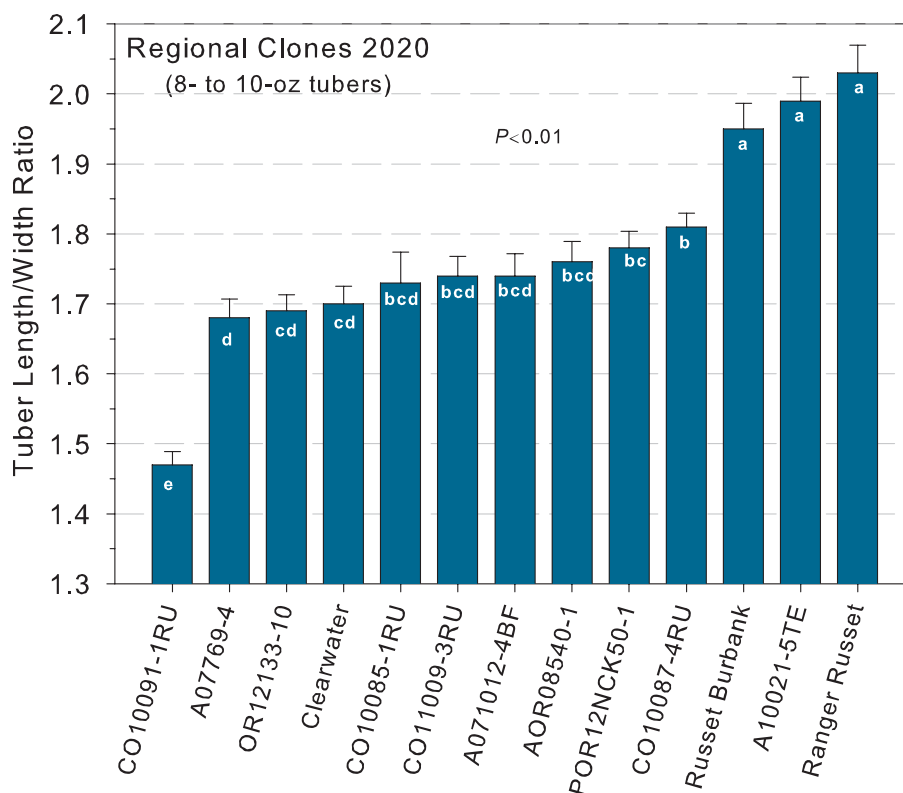
French Fry Yield vs Tuber L/W Ratio

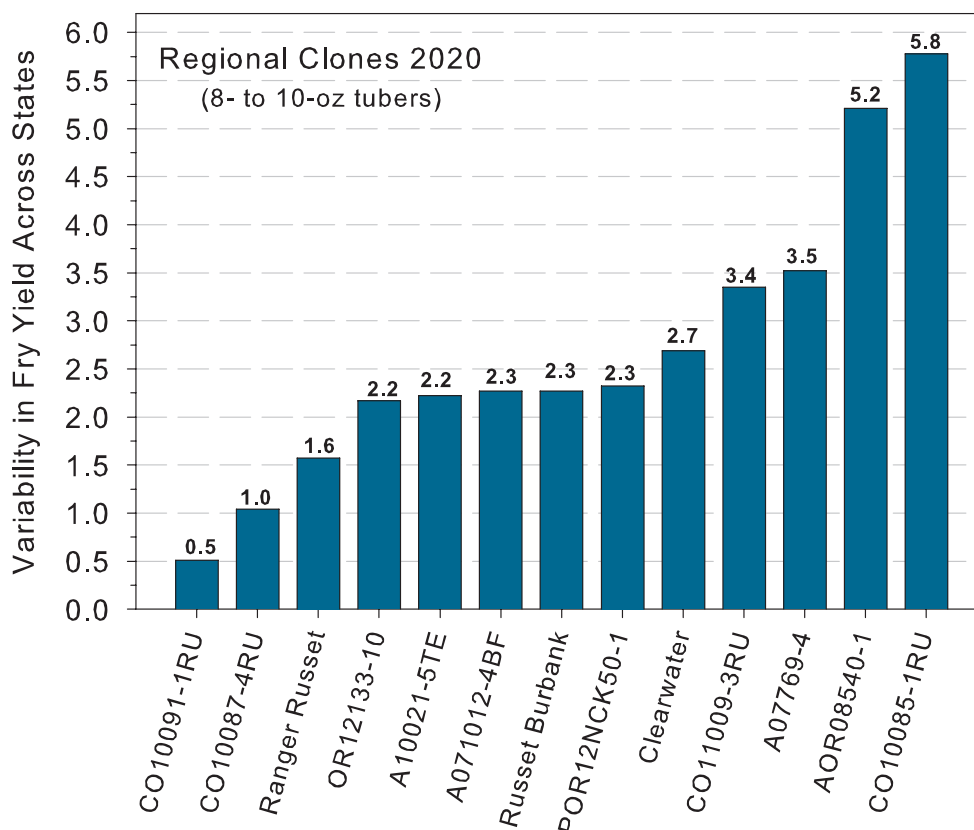
≥3-inch-long (% by weight)

8-10 oz tubers



2020 Late Harvest Regional 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, CO10085-1RU had a length to width ratio of 1.53, resulting in 86% of the tuber producing usable French fries ≥ 3 inches in length (page 90). However, tuber shape of this entry also varied the most across production sites (see above), resulting in fry yields ranging from 80 to 92% ($86 \pm 5.8\%$).

Pages 89-90: Tuber length to width ratios and the associated percentage yield of fries. Bars with same letter are not significantly different ($P \leq 0.01$).

2020 Tri-State Specialty Trial

Location: WSU Research Center – Othello, WA

Planting Date: April 16

Vine Kill Date: July 24

Harvest Date: August 10

Days Grown: 99

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 3 local reference varieties to 7 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/White flesh: NDA8512C-1R

Red/Yellow flesh: A08122-9RY

Yellow/Yellow flesh: A08123-5Ysto

Standcounts

➤ 50 Day

Full emergence: Chieftain (93%) and A08122-9RY (94%).

Plant and Tuber Growth & Development

➤ 50 Day Stems per plant

Most: A11635-9RYsto and A08122-9RY (2.5).

Fewest: Yukon Gold (1.7).

➤ Average Tuber Number Per Plant

Most: A08122-9RY (13.1) and Modoc (10.8).

Fewest: A08120-4Y (4.0) and A14046-4R (4.4).

➤ Average Tuber Size (oz)

Largest: Yukon Gold (7.3) and Chieftain (5.9).

Smallest: A08120-4Y (1.6) and A11573-5RYsto (1.9).

Yield Data

➤ Total Yield and U.S. #1 Yield

Highest: Chieftain had the highest total (792 CWT/A) and highest U.S. #1 yield (788 CWT/A),

NDA8512C-1R had the second highest total yield (632 CWT/A) and A08122-9RY had the second highest U.S. #1 yield (603 CWT/A).

Lowest: A08120-4Y had the lowest total (92 CWT/A) and U.S. #1 yield (92 CWT/A).

2020 Tri-State Specialty Trial

Summaries

ENTRY	TOTAL YIELD		US # 1's* > 0 oz	US # 2's* > 0 oz	Culls* > 0 oz	EXTERNAL DEFECTS		
						1 = Severe	5 =None	
	CWT/A	Tons/A	----- % of Total Yield -----			Growth		
	Knobs	Cracks	Green					
Red Skin/White Flesh								
Chieftain	792	39.6	100	0	0	0	0	0
Modoc	568	28.4	99	1	0	0	0	0
A14046-4R	186	9.3	100	0	0	0	0	0
NDA8512C-1R	632	31.6	94	0	6	0	5	1
Red-Purple/Yellow Flesh								
A08122-9RY	608	30.4	99	0	1	0	0	0
A11573-5RYsto	274	13.7	100	0	0	0	0	0
Yellow Flesh								
Yukon Gold	580	29.0	98	1	1	0	1	1
A08120-4Y	92	4.6	100	0	0	0	0	0
A08123-5Ysto	392	19.6	98	1	1	0	0	0
A11635-1RYsto	488	24.4	97	0	3	0	0	3

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	788	39.4	2	12	29	42	15	1.073
Modoc	563	28.1	9	40	36	12	3	1.067
A14046-4R	186	9.3	19	46	28	8	0	1.065
NDA8512C-1R	597	29.9	8	28	35	26	3	1.076
Red-Purple/Yellow Flesh								
A08122-9RY	603	30.2	16	43	26	14	1	1.077
A11573-5RYsto	274	13.7	49	47	3	0	0	1.073
Yellow Flesh								
Yukon Gold	567	28.3	1	8	14	43	34	1.083
A08120-4Y	92	4.6	70	28	2	0	0	1.057
A08123-5Ysto	385	19.2	15	40	30	14	1	1.066
A11635-1RYsto	475	23.7	10	29	27	20	14	1.070

ENTRY	SKIN SET	TUBER SHAPE	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
Red Skin/White Flesh								
Chieftain	4.0	1.0	93	1.8	5.9	9.3	2.3	3.0
Modoc	4.0	2.0	73	2.4	3.7	10.8	3.5	3.0
A14046-4R	4.0	1.0	81	2.1	2.9	4.4	3.3	3.0
NDA8512C-1R	3.0	1.0	88	1.9	4.2	10.5	3.0	3.0
Red-Purple/Yellow Flesh								
A08122-9RY	4.0	1.0	94	2.5	3.3	13.1	3.7	4.0
A11573-5RYsto	4.0	1.0	81	2.3	1.9	9.8	4.0	4.0
Yellow Flesh								
Yukon Gold	4.0	1.0	89	1.7	7.3	5.5	3.0	3.3
A08120-4Y	4.0	1.0	70	2.3	1.6	4.0	4.0	4.0
A08123-5Ysto	4.3	1.3	71	1.9	3.3	8.1	2.5	2.5
A11635-1RYsto	4.0	1.0	79	2.5	4.2	8.5	3.0	4.0

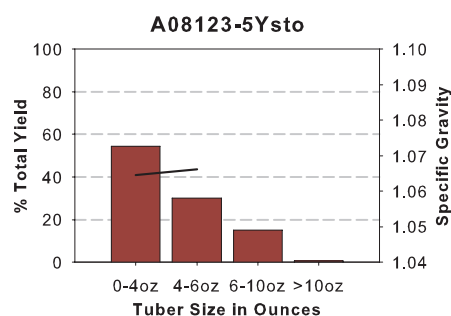
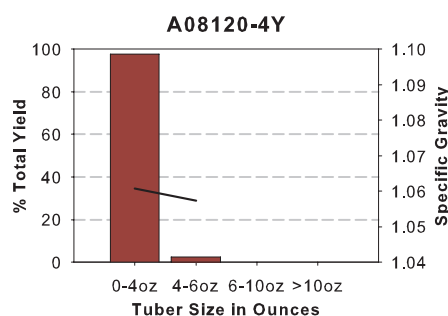
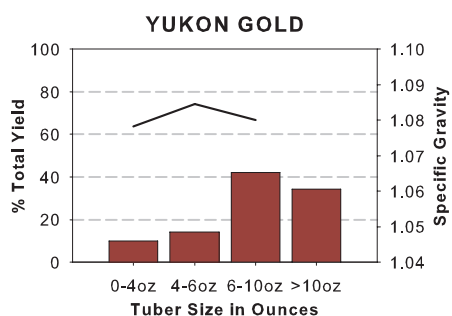
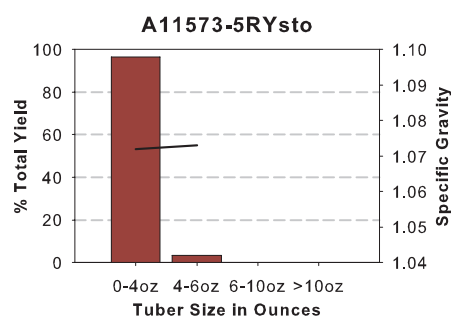
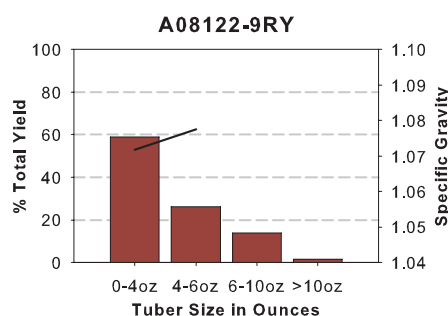
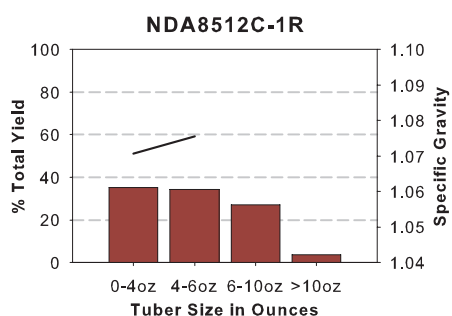
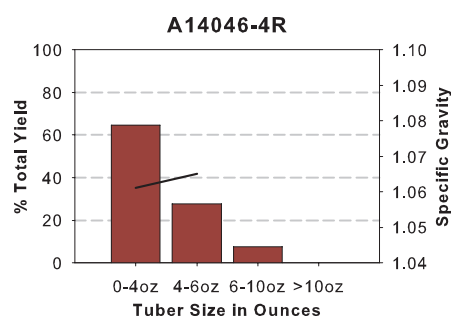
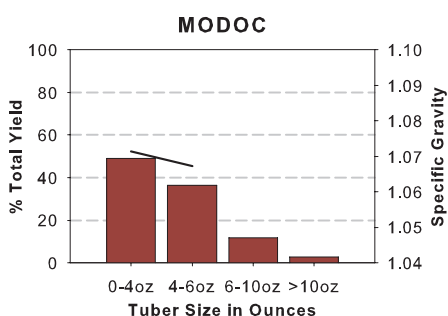
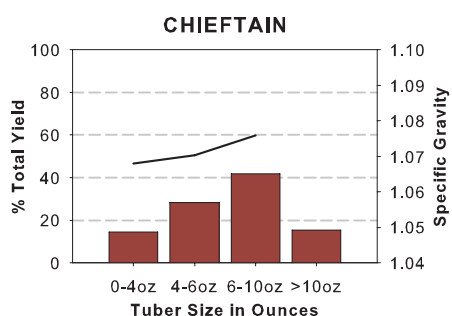
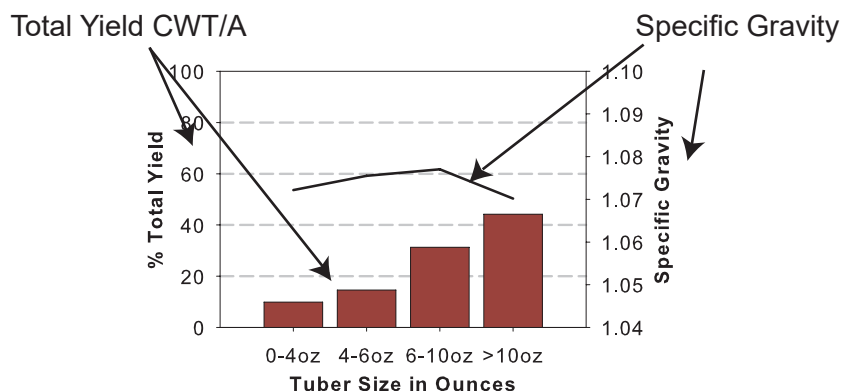
* Percent values may not total 100% due to rounding

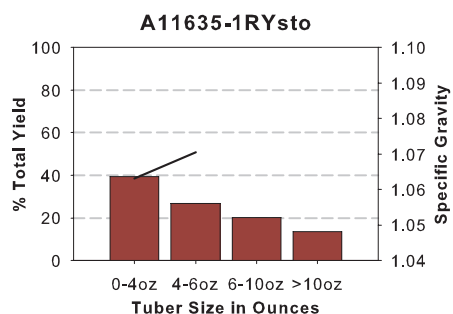
2020 Tri-State Specialty Trial

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





Postharvest Analysis

- There were six red skinned and four yellow fleshed entries in this year's trial. A08122-9RY, A11573-5RYsto and A11635-1RYsto have red skin and yellow flesh. Yukon Gold, A08120-4Y and A08123-5Ysto have yellow skin.
- As in previous years, culinary scores were high with all entries receiving 72 to 80% of the total points possible in the 2020 culinary evaluations.
- The highest (Yukon Gold, 59.7/75) and lowest (A08123-5Ysto, 54/75) scoring clones differed by only 5.7 points.

Overall Culinary Evaluation Scores

Clone	Boiled (25 max)	Baked (25 max)	Microwaved (25 max)	Total (75 max)
7 Yukon Gold	20.0	19.4	20.2	59.7
6 A11573-5RYsto	18.5	20.1	19.5	58.1
10 A11635-1RYsto	19.2	19.0	19.4	57.6
1 Chieftain	19.4	19.0	19.1	57.4
5 A08122-9RY	18.6	19.0	19.0	56.6
2 Modoc	20.5	18.4	17.6	56.6
4 NDA8512C-1R	19.8	17.7	18.2	55.7
3 A14046-4R	18.3	19.6	17.8	55.7
8 A08120-4Y	17.8	19.3	17.4	54.5
9 A08123-5Ysto	16.9	17.5	19.7	54.0

Chipped: Aug. 25
 Boiled: Aug. 25
 Microwaved: Aug. 20
 Baked: Aug. 17
 Cooking Time: Aug. 21

- Modoc had no after cooking darkening when oven baked. All other entries had slight after cooking darkening. The texture of baked samples of Modoc, NDA8512C-1R and A08123-5Ysto was “pastey”; all other entries rated favorably as “creamy” or “fluffy”. The baked samples of all entries had acceptable flavor, which was rated as “good” or “bland”. The skins of baked Modoc, NDA8512C-1R and A11635-1RYsto tubers were rated as “steamy”, while skins of the other entries were rated as “fully cooked” after baking.
- A08120-4Y showed no sloughing when boiled. All other entries showed slight to moderate sloughing when boiled. Chieftain, Modoc and Yukon Gold had no after cooking darkening; all other boiled entries had “slight” after cooking darkening. The texture of A08120-4Y was “pastey”; all other samples were favorably rated as “fluffy” or “creamy”. The tuber centers of all entries were rated as “mushy” or “fully cooked”.
- Microwaving produced no after cooking darkening in Chieftain, Modoc and Yukon Gold. After cooking darkening in the remaining entries was rated as “slight”. Texture of microwaved samples was favorably rated as “fluffy” or “creamy” except for A08120-4Y and A11635-1RYsto, which were rated as “pastey”. The flavor ratings of microwaved samples ranged from “bland” to “good” for all entries. Tuber center ratings of all entries were rated as “mushy”. Skins were rated favorably as either “steamy” or “fully cooked” following microwaving.
- A14046-4R produced the darkest chips with a SFA color rating of five (Table 8B). All other entries produced chips, ranging from 3.8 (Chieftain) to 4.5 (Yukon Gold) on the SFA 1-5 scale, with the average being 4.2.
- Cooking time for boiled samples was assessed again 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 end cores averaged 5.5 min to cook compared with 4.3 min for bud end cores (Table 8B). Cooking times (stem end) ranged from 4.2 min (NDA8512C-1R) to 6.3 min (Modoc). Average cooking times ranged from 3.8 minutes for NDA8512C-1R to 5.8 minutes for A14046-4R.

2020 Washington Tri-State Specialty Trial

Red Clone Culinary Evaluation

Boiled

Clone	Flavor	After Cooking Darkening	Texture	Tuber Center	Sloughing	Total Rating
1 Chieftain	3.7	4.7	3.2	4.7	3.2	19.4
2 Modoc	4.0	4.5	3.2	4.8	4.0	20.5
3 A14046-4R	2.8	3.8	3.4	4.6	3.7	18.3
4 NDA8512C-1R	4.1	4.3	3.2	4.3	3.8	19.8
5 A08122-9RY	2.5	4.2	3.8	4.3	3.8	18.6
6 A11573-5RYsto	3.3	3.8	2.8	4.2	4.3	18.5
<i>LSD 0.05</i>	1.2	0.7	<i>ns</i>	<i>ns</i>	0.8	2.2
Average	3.4	4.2	3.3	4.6	3.8	19.5

Oven Baked

Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
1 Chieftain	3.7	4.2	2.8	3.5	4.8	19.0
2 Modoc	3.5	4.5	2.4	3.7	4.3	18.4
3 A14046-4R	3.3	4.0	3.1	4.3	4.8	19.6
4 NDA8512C-1R	2.7	4.2	2.4	4.2	4.3	17.7
5 A08122-9RY	2.5	3.7	3.5	4.8	4.5	19.0
6 A11573-5RYsto	3.8	4.2	2.8	4.7	4.7	20.1
<i>LSD 0.05</i>	<i>ns</i>	0.5	1.0	1.3	<i>ns</i>	<i>ns</i>
Average	3.3	4.1	2.8	4.2	4.6	18.7

Microwaved

Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
1 Chieftain	3.3	4.7	3.6	3.5	4.0	19.1
2 Modoc	3.2	4.5	2.8	3.3	3.8	17.6
3 A14046-4R	3.2	4.2	3.1	3.2	4.2	17.8
4 NDA8512C-1R	3.2	4.2	2.5	3.7	4.7	18.2
5 A08122-9RY	3.5	3.8	3.0	4.0	4.7	19.0
6 A11573-5RYsto	3.7	4.2	3.8	4.0	3.8	19.5
<i>LSD 0.05</i>	<i>ns</i>	0.7	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Average	3.2	4.4	3.0	3.4	4.2	18.2

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

2020 Washington Tri-State Specialty Trial

Specialty Clone Culinary Evaluation

Boiled

Clone	Flavor	After Cooking Darkening	Texture	Tuber Center	Sloughing	Total Rating
7 Yukon Gold	4.2	4.5	4.2	4.5	2.7	20.0
8 A08120-4Y	3.2	3.8	1.8	4.0	5.0	17.8
9 A08123-5Ysto	3.2	3.7	3.2	4.2	2.7	16.9
10 A11635-1RYsto	3.3	3.8	3.2	4.7	4.2	19.2
LSD 0.05	ns	ns	ns	ns	1.5	3.0
Average	3.5	4.0	3.1	4.2	3.4	18.2

Oven Baked

Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
7 Yukon Gold	3.3	3.7	3.6	3.8	5.0	19.4
8 A08120-4Y	3.5	3.7	3.0	4.2	5.0	19.3
9 A08123-5Ysto	2.8	3.8	2.0	4.2	4.7	17.5
10 A11635-1RYsto	2.8	3.8	3.6	4.7	4.2	19.0
ns	ns	ns	1.3	ns	0.8	ns
Average	3.2	3.7	2.9	4.1	4.7	18.8

Microwaved

Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
7 Yukon Gold	3.8	4.5	3.2	4.0	4.7	20.2
8 A08120-4Y	2.5	3.8	2.4	3.8	4.8	17.4
9 A08123-5Ysto	3.5	4.3	3.0	3.8	5.0	19.7
10 A11635-1RYsto	4.0	4.3	2.4	4.3	4.3	19.4
ns	ns	ns	ns	ns	ns	ns
Average	3.3	4.2	2.9	3.9	4.8	19.2

*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 SFA	Time to Breakdown (min)		
		Stem	Bud	Average
1 Chieftain	3.8	6.1	4.0	5.1
2 Modoc	4.3	6.3	4.6	5.5
3 A14046-4R	5.0	6.1	5.6	5.8
4 NDA8512C-1R	4.0	4.2	3.5	3.8
5 A08122-9RY	4.1	5.7	4.0	4.8
6 A11573-5RYsto	3.4	5.3	4.7	5.0
7 Yukon Gold	4.5	5.7	4.0	4.9
8 A08120-4Y	4.3	4.7	4.6	4.7
9 A08123-5Ysto	4.0	4.8	4.2	4.5
10 A11635-1RYsto	4.4	5.8	4.2	5.0
LSD 0.05 *		1.1	0.5	
Average	4.2	5.5	4.3	4.9

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



Digging holes for field probes



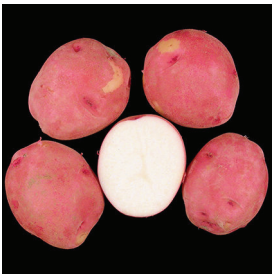
Seed Lot sample bags lined up.



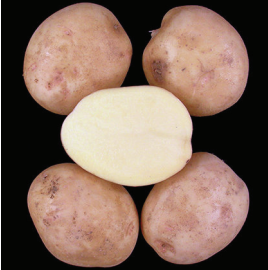
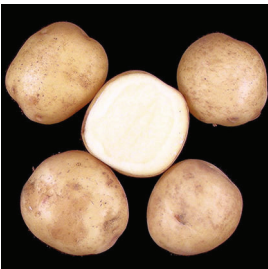
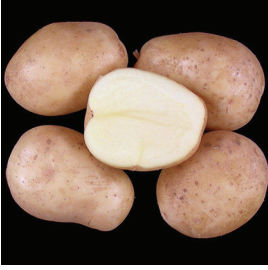
Proper PPE

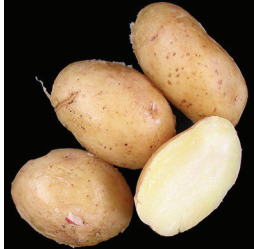


Social Distancing at Seed Lot readings.

Tubers	WA Tri-State Specialty Trial Comments
Chieftain	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, good flavor, mushy tuber center, fully cooked skin. Boiled: moderate sloughing, none after cooking darkening, creamy texture, good flavor, fully cooked tuber center. Microwaved: none after cooking darkening, fluffy texture, bland flavor, mushy tuber center, steamy skin.
Modoc	
	Tubers: Round to oblong tubers. Good skin set; shallow eyes. Baked: none after cooking darkening, pastey texture, bland flavor, mushy tuber center, steamy skin. Boiled: slight sloughing, none after cooking darkening, creamy texture, good flavor, fully cooked tuber center. Microwaved: none after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin.
A14046-4R	
	Tubers: Round tubers. Good skin set; moderately deep eyes. Baked: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, fully cooked skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, fully cooked tuber center. Microwaved: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, steamy skin.
NDA8512C-1R	
	Tubers: Round tubers. Fair skin set; moderate eye depth. Baked: slight after cooking darkening, pastey 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, mushy tuber center, fully cooked skin.
A08122-9RY	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, bland flavor, fully cooked tuber center, fully cooked skin. Boiled: slight sloughing, slight after cooking darkening, fluffy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, fully cooked skin.

Chips	Baked	Boiled	Microwaved
Chieftain			
			
Modoc			
			
A14046-4R			
			
NDA8512C-1R			
			
A08122-9RY			
			

Tubers	WA Tri-State Specialty Trial Comments
A11573-5RYsto	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, creamy texture, good flavor, fully cooked tuber center, fully cooked skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, fluffy texture, good flavor, mushy tuber center, steamy skin.
Yukon Gold	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, fluffy texture, bland flavor, mushy tuber center, fully cooked skin. Boiled: moderate sloughing, none after cooking darkening, fluffy texture, good flavor, fully cooked 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, creamy texture, bland flavor, mushy tuber center, fully cooked skin. Boiled: none sloughing, slight after cooking darkening, pastey texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, pastey texture, bland flavor, mushy tuber center, fully cooked skin.
A08123-5Ysto	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, pastey texture, bland flavor, mushy tuber center, fully cooked skin. Boiled: moderate sloughing, slight after cooking darkening, creamy texture, bland flavor, mushy tuber center. Microwaved: slight after cooking darkening, creamy texture, bland flavor, mushy tuber center, fully cooked skin.
A11635-1RYsto	
	Tubers: Round tubers. Good skin set; moderate eye depth. Baked: slight after cooking darkening, fluffy texture, bland flavor, fully cooked tuber center, steamy skin. Boiled: slight sloughing, slight after cooking darkening, creamy texture, bland flavor, fully cooked tuber center. Microwaved: slight after cooking darkening, pastey texture, good flavor, mushy tuber center, steamy skin.

Chips	Baked	Boiled	Microwaved
A11573-5RYsto			
			
Yukon Gold			
			
A08120-4Y			
			
A08123-5Ysto			
			
A11635-1RYsto			
			

Index of Clones and Cultivars

Early Harvest Tri-State Trial22-27

A09119-4LB
A10594-4sto
A11188-1
A11271-2TE
A12305-2adg
AFA5661-8

AOR11217-3
Clearwater Russet
COA11013-2
Ranger Russet
Russet Burbank
Russet Norkotah

Shepody

Late Harvest Tri-State Trial28-55

A09119-4LB
A10594-4sto
A11188-1
A11271-2TE
A12305-2adg

AFA5661-8
AOR11217-3
Clearwater Russet
COA11013-2
Ranger Russet

Russet Burbank
Russet Norkotah

Early Harvest Regional Trial56-63

A071012-4BF
A07769-4
A10021-5TE
AOR08540-1
AOR10204-3
Clearwater Russet
CO10085-1RU
CO10087-4RU

CO10091-1RU
CO11009-3RU
OR12133-10
POR12NCK50-1
Ranger Russet
Russet Burbank
Russet Norkotah
Shepody

TX13590-9Ru

Late Harvest Regional Trial64-91

A071012-4BF
A07769-4
A10021-5TE
AOR08540-1
AOR10204-3
Clearwater Russet

CO10085-1RU
CO10087-4RU
CO10091-1RU
CO11009-3RU
OR12133-10
POR12NCK50-1

Ranger Russet
Russet Burbank
Russet Norkotah
TX13590-9Ru

Tri-State Specialty Trial92-103

A08120-4Y
A08122-9RY
A08123-5Ysto
A11573-5RYsto
A11635-1RYsto
A14046-4R

Chieftain
Modoc
NDA8512C-1R
Yukon Gold