2017 Potato Cultivar Yield and Postharvest Quality Evaluations

WSU Potato Research Group

Washington State University

World Class. Face to Face.

2017 Potato Cultivar Yield and Postharvest Quality Evaluations

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On the cover: A drone was used this year to take aerial photos of the potato seed lot research trial.
Photo courtesy of Paco Gonzalez

Special Thanks

John Steinbock; Mark Weber; Mike Clouse; Martin Moore; Washington State Potato Commission; Growers and Industry; Dennis Johnson; Tom Cummings; Tim Waters; Carrie Wohleb; Alex Cruz; Northwest Potato Consortium; Paco Gonzalez; Colton Thurgood; Francisco Atilano; Parker Dolezal; Rachel Dannay; Aldair Escalante

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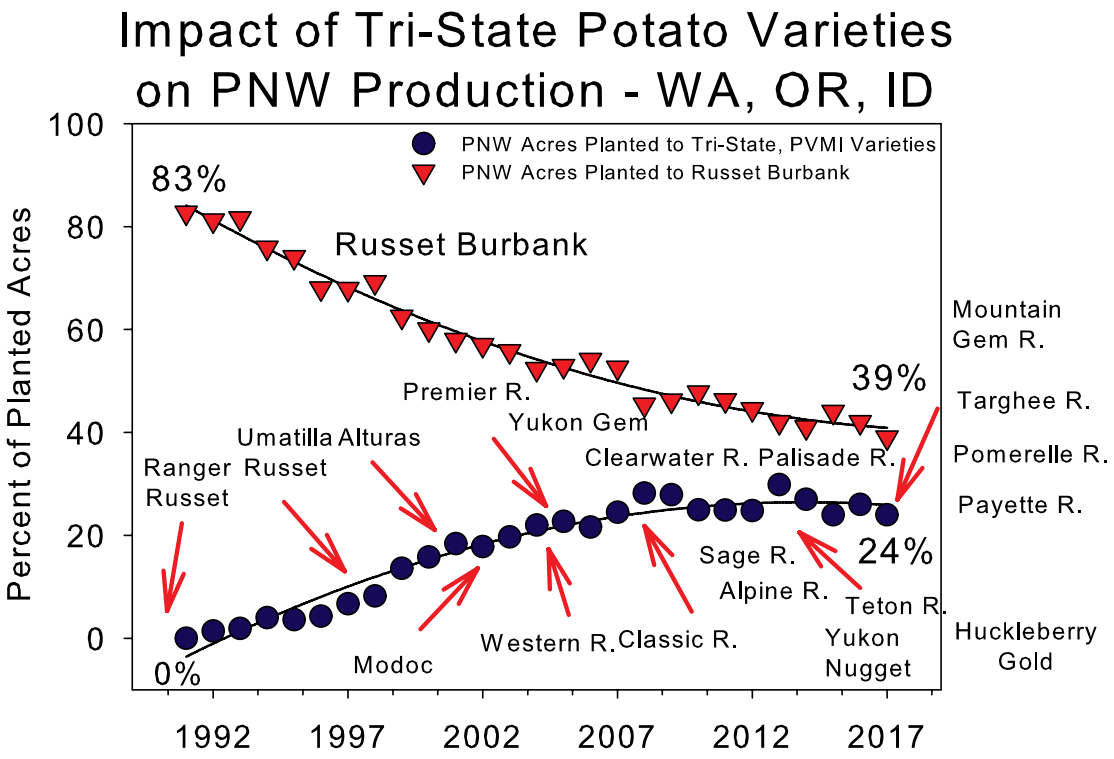
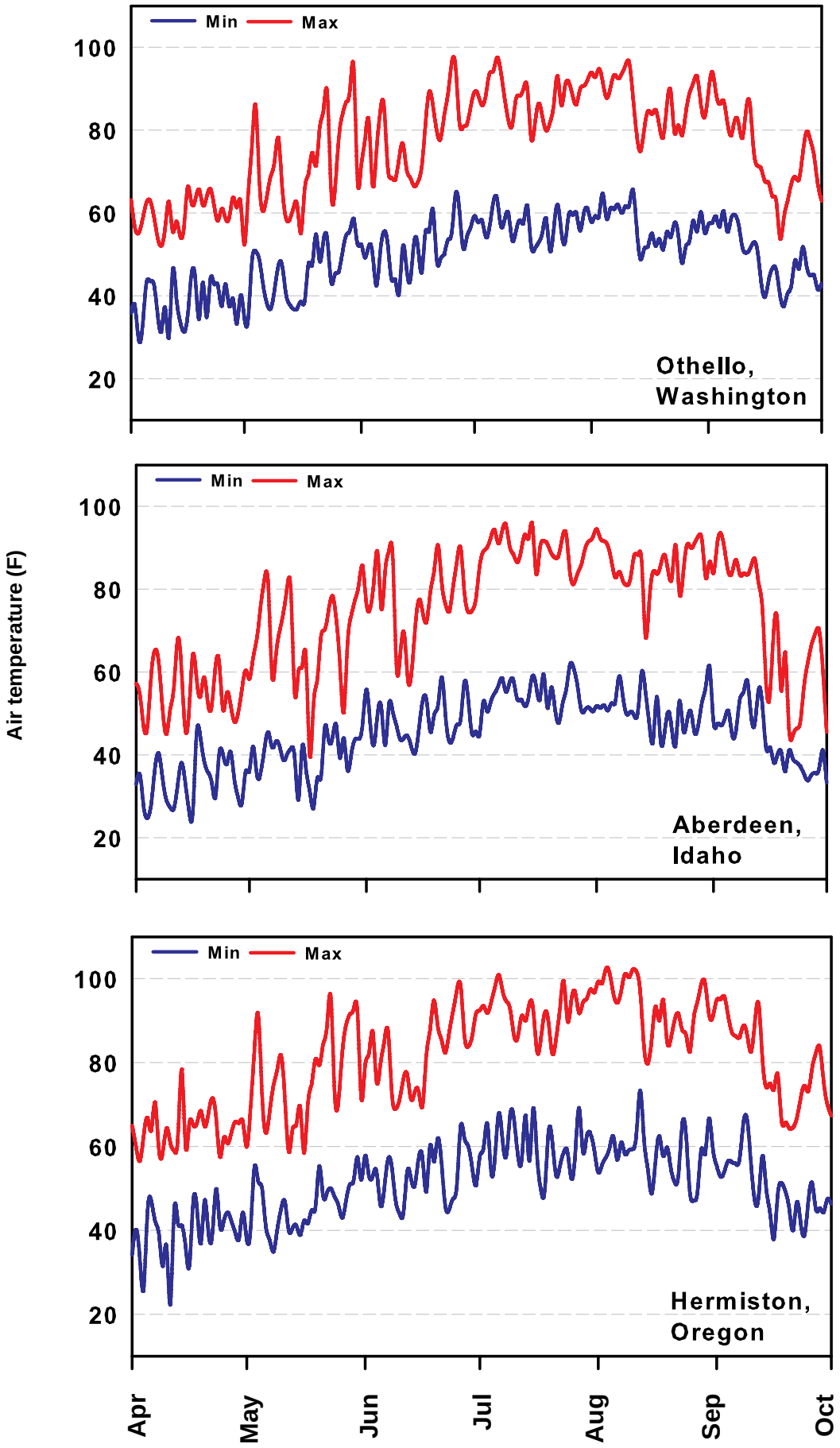
INTRODUCTION

The 2017 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: The effect of the Tri-State Potato Variety Development Program on the Northwest potato industry has been substantial. **Ranger Russet, Umatilla Russet, Clearwater Russet, Bannock Russet, and Alturas**, 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, 8th, 10th, and 12th most widely grown cultivars in the United States in 2017, respectively, with Tri-State varieties representing 24%, or 217,600 acres, of the fall crop nationally. (NASS, Crop Production, November 2017). **Ranger Russet, Umatilla Russet, and Clearwater Russet** were the 3rd, 4th, and 5th most widely grown cultivars in the PNW (ID, OR, WA) in 2017, respectively, and accounted for 23% of the PNW planted acreage. Varieties recently released by the Tri-State program are now produced on more than 138,000 acres in the Pacific Northwest with value to growers estimated at approximately $700 million. In the past 15 years, the US farm-gate value of Tri-State varieties has increased by approximately $130 million.



2017 Growing Season Temperatures



Guide to Clone Designations

Example: ATX91137-1Ru		
	ATX91137-1Ru	Breeding Program (**A**berdeen, ID)
	A**TX**91137-1Ru	Selection Site (**T**e**x**as)
	ATX**91**137-1Ru	Year of Cross (19**91**)
	ATX91**137**-1Ru	Cross Number (**137**)
	ATX91137-**1**Ru	Tuber Selection (**1**)
	ATX91137-1**Ru**	Russet (**Ru**)

Location Codes

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

Miscellaneous Designations

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

OVERALL CULTIVAR & CLONE PERFORMANCE

Merit Score Methods

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

FRESH MARKET MERIT SCORE METHODS:

75% Fresh market economic value

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

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

EARLY PROCESS MARKET MERIT SCORE METHODS:

75% Early harvest process market economic value

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

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

LATE PROCESS MARKET MERIT SCORE METHODS:

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

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

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

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

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

Entry	Year	Early/Late* Harvest Total Yield	US # 1 & 2 Yield > 6 oz	Specific Gravity	Average Tuber Weight/ Number per Plant	Bruise Blackspot/ Shatter	Internal** Issues	Merit Scores (5 = Best) Field Performance Early/Late Fresh	Field Performance Early/Late Process	Postharvest Processing Performance
		CWT/A	% of Total		oz/number	%				
A03141-6	2017	439/873	93	1.094	14.7/5.1	5/79	none	2.5/0.9	5.0/2.7	2.8
	2016	569/845	91	1.095	12.4/5.7	29/68	none	2.4/1.7	3.9/3.9	3.5
	2015	456/790	87	1.089	12.9/5.3	6/94	none	2.3/1.5	4.3/4.1	4.7
	2014	555/771	89	1.083	13.3/5.0	20/40	none	2.2/1.4	4.4/4.5	4.3
	2013	483/871	80	1.084	7.7/9.2	21/44	36% HH	2.8/2.1	2.4/4.6	4.5
	High yields of large tubers, could be used as a Shepody early-harvest replacement. Processes well early and late, not recommended for the fresh industry. Short tubers, shatter bruise and hollow heart may be a concern. Storage dormancy may be good.									
AO03123-2	2017	411/721	77	1.097	7.5/8.3	3/73	none	0.9/3.0	1.5/2.2	2.9
	2016	469/771	75	1.091	8.0/7.9	3/67	none	0.9/1.9	1.8/4.2	3.8
	2015	389/693	79	1.090	8.4/7.2	4/96	none	1.2/2.3	3.6/3.5	4.7
	2014	429/553	79	1.086	8.3/5.8	19/44	3% HH	2.0/1.1	2.4/2.9	3.5
	2013	343/941	78	1.085	7.5/10.1	8/50	none	1.5/3.5	2.2/4.7	4.6
	High resistance to blackspot bruising is a plus. This clone performs best as a late harvest french fry processor. Due to irregular tuber shape and high shatter bruise, the fresh market may not be a good option. Storage dormancy may be good.									
AOR06070-1KF	2017	437/819	79	1.101	8.8/8.1	3/85	8% HH	1.4/1.4	2.9/2.0	2.9
	2016	569/872	81	1.096	9.2/7.9	18/87	3% HH	1.6/2.0	2.8/3.7	3.7
	2015	426/789	84	1.095	9.4/7.3	0/82	none	1.6/1.9	4.0/3.7	4.3
	2014	500/689	80	1.093	10.0/6.0	18/79	none	1.3/1.4	3.1/3.1	3.8
	2013	347/992	81	1.091	10.5/7.7	23/88	4% HH	1.4/1.4	2.7/2.8	4.0
	High specific gravity. Typically 80% of tubers are larger than 6 oz. Blackspot bruising appears to be lower than Ranger R, but shatter is a concern. Could be used for early, medium and late-harvest french fry processing. Hollow heart is a concern.									
Ranger R.	2017	453/754	81	1.104	6.1/8.3	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
	2015	479/851	77	1.086	7.1/8.8	17/23	none	NA	3.6/3.8	4.9
	2014	524/681	76	1.077	8.9/6.6	49/19	3% IBS	NA	4.3/2.5	2.8
	2013	479/821	75	1.085	7.9/8.4	29/45	none	NA	2.7/4.4	3.8
	Long, shape variable at times, yet uniform other times.									
R. Burbank	2017	428/752	77	1.088	4.8/8.2	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
	2015	460/677	70	1.072	7.7/8.0	41/59	3% BC	1.3/1.4	2.9/1.2	2.7
	2014	466/730	63	1.077	9.4/6.8	31/61	3% HH, 6% IBS	0.9/0.4	1.3/1.2	2.0
	2013	364/738	67	1.075	8.0/7.5	22/47	9% HH, 3% BC	1.2/0.6	1.4/1.7	1.9
	Shape typically variable, often with many growth cracks and knobs.									
R. Norkotah (Fresh Market) only	2017	545/685	76	1.076	6.3/7.7	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
	2015	468/602	70	1.065	7.7/7.6	21/29	none	1.7/2.5	NA	NA
	2014	465/730	73	1.068	7.5/8.0	22/11	none	2.3/3.5	NA	NA
	2013	364/598	58	1.067	5.7/8.5	18/33	3% HH, 3% IBS	2.0/1.0	NA	NA
	Shape and skin typically very uniform, size profile typically on the small side.									
Shepody (Early Harvest) only	2017	415	80	1.077	8.3	7/0	none	NA	3.4/NA	-
	2016	502	82	1.092	11.1/4.9	29/24	none	NA	4.3/NA	-
	2015	487	72	1.076	6.7	7/7	none	NA	3.4/NA	-
	2014	553	84	1.073	9.9/5.8	13/0	none	NA	3.8/NA	-
	2013	354	77	1.062	7.9/4.4	5/10	none	NA	2.6/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.									

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

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

2017 Tri-State Specialty Potato Clones - Washington State University

2017 Tri-State Specialty Trial

	US #1 Yield 2017				(See also Tri-State Specialty Section near end of book)
	US#1 Yield	0-6 oz	6-10oz	Fresh Market Appearance	
	CWT/A	-----%-----		5 = best	Comments
Red Skin/White Flesh*					
Chieftain	649	42	42	4.0	Typy, uniform size. Deep red color.
Yellow Flesh					
Yukon Gold	479	25	33	3.0	Lots of rhizoc, large tubers.
A06336-2Y	421	77	22	3.3	Small, a bit flat, some rhizoc.
A06336-5Y	475	96	3	4.0	Nice, uniform shape and size.
Fingerling					
LaRatte	108	77	0	3.0	Light skin, long and pointy.
POR11PG62-3	216	96	0	3.0	Lots of irregular shapes, small.

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

Chieftain

LaRatte

A06336-2Y

Yukon Gold

A06336-5Y

POR11PG62-3

At-Harvest Grading Comments & Fresh Market Appearance

Newest Lines - 2017 Tri-State Trials			
	Fresh Market Appearance 1-5 (5 = Best)		
Clone	2017	2016	Tuber Appearance Comments*
Early Harvest Tri-State			
Ranger Russet	2.3	2.7	Shape a bit irregular, lots of points.
Russet Burbank	2.0	2.0	Shapes a bit irregular, cracks, UGLY.
Russet Norkotah	4.0	3.7	Mostly typy, dark russet.
Shepody	3.0	2.0	Typical Shepody, light skin, plump.
A07088-6	2.3	2.0	A lot of short ones, not an early variety.
A07098-4	2.0	-	Light skin, large range of shapes.
A071012-4BF	2.0	2.0	Highly irregular shapes, light russet, not early. DISCARD
A07705-4	3.0	-	Light russet, wide range in size, not early.
A07769-4	3.0	-	Smaller, short and plump.
A08422-2VRsto	2.7	3.0	Short, light russeting, small, not early.
A08422-4VRsto	2.0	-	Many pears, not early.
A08510-1LB	2.7	-	Small, round, light russet.
A10021-5TE	2.3	-	Irregular shapes, bad skin, long and skinny.
AOR06576-1	2.3	3.3	Not early, light russet, irregular shapes.
AOR07821-1	3.3	2.3	Nice dark russet, typy, but a bit short.
POR12NCK50-1	4.0	-	Looked like Norkotah, but smaller. Dark russet, typy.
Late Harvest Tri-State			
Ranger Russet	2.0	3.0	Large, shape a bit irregular.
Russet Burbank	1.7	2.5	Many irregular shapes.
Russet Norkotah	4.0	3.5	Mostly typy.
A07098-4	2.0	-	Light skin, most had good length, a few were round.
A071012-4BF	2.5	2.0	Short and plump.
A07705-4	2.0	-	Many pears with irregular shapes.
A07769-4	2.3	-	Plump, some long, some short.
A08422-2VRsto	2.0	2.8	Most too short, irregular shapes.
A08510-1LB	1.0	-	Too small, many round, DISCARD!
A10021-5TE	1.8	-	Mostly typy, but really bad skin. (Road mapping)
AOR06576-1	3.0	2.0	Long, good length, somewhat typy.
AOR07821-1	2.0	2.0	Some very irregular shapes, lumpy, oval.
POR12NCK50-1	3.0	-	Blocky, shape mostly uniform.

*Typy - Visually appealing, uniform tuber shape.

POR12NCK50-1

AOR06576-1

POR12NCK50-1

R. Norkotah

At-Harvest Grading Comments & Fresh Market Appearance

Advanced Lines - 2017 Regional Trials				
	Fresh Market Appearance 1-5 (5 = Best)			
Clone	2017	2016	2015	Tuber Appearance Comments*
Early Harvest Regional				
Ranger Russet	3.0	4.0	3.0	Mostly typy, good size, a bit pointy.
Russet Burbank	2.7	2.3	2.5	Irregular shape, poor skin set.
Russet Norkotah	4.0	3.3	2.5	Typy, nice size and skin set.
Shepody	3.0	1.7	2.0	Large, light color skin, poor skin set.
A03141-6	2.7	2.3	2.0	Non uniform shape and russeting.
A06030-23	3.7	2.0	4.0	Typy, light eyes, dark skin, smaller.
A07061-6	2.0	2.0	-	Small, not early, ugly.
A08009-2TE	3.3	3.0	4.0	Mostly typy, good skin set, smaller.
A08433-4VR	2.3	-	-	Nonuniform shape and size, ugly.
AO03123-2	2.7	2.7	3.0	Not early, small, irregular shapes.
AO06191-1	4.0	4.0	4.0	Typy with nice skin.
AOR06070-1KF	2.3	2.3	1.7	Shape not uniform, lumpy.
AOR07781-5	2.7	3.3	-	Large, deep eyes, bumpy.
CO08065-2RU	3.7	-	-	Lots of cracks, smaller.
CO08155-2RU/Y	2.7	-	-	Elephant hide on 20%, not an early variety.
CO08231-1RU	3.3	-	-	Not early, typy, small and round.
COTX09022-3RuRE/Y	2.0	2.0	1.0	Round pink eyes, russeting is ugly, discard!
TX08352-5Ru	3.7	3.7	4.0	Small, typy, good skin set.
Late Harvest Regional				
Ranger Russet	2.3	3.3	2.0	Long, shape a bit irregular.
Russet Burbank	2.3	2.7	2.8	Many irregular shapes.
Russet Norkotah	4.0	3.0	4.0	Mostly typy.
A03141-6	1.3	1.8	1.8	Large, round, and lumpy! Ugly.
A06030-23	3.5	3.0	4.0	Mostly typy, uniform shape, nice skin.
A07061-6	2.0	2.0	-	Light russeting with buff skin, mostly round.
A08009-2TE	2.5	3.5	3.0	Some typy, a bit short, some irregular shapes.
A08433-4VR	1.3	-	-	Short, oval, flat, look like river rocks.
AO03123-2	3.0	2.0	3.3	Good length, a few round tubers.
AO06191-1	3.3	4.0	4.0	Large tubers, typy, nice skin and uniform size.
AOR06070-1KF	1.3	2.0	2.5	Very irregular shaped, DISCARD.
AOR07781-5	2.5	3.8	-	Somewhat typy, non uniform shape and size.
CO08065-2RU	1.7	-	-	Bad skin, with lots of cracks.
CO08155-2RU/Y	2.0	-	-	Small, severe elephant hide.
CO08231-1RU	2.5	-	-	Many short ones, irregular shapes.
COTX09022-3RuRE/Y	2.0	1.5	1.0	Round russet with pink eyes. Maybe a chipper?
TX08352-5Ru	4.0	3.0	4.0	Looks like Russet Norkotah, but smaller.

*Typy - Visually appealing, uniform tuber shape

AO06191-1

A06030-23

AO06191-1

A06030-23

FRESH MARKET MERIT - NEWEST LINES
2015-2017

(5 = best) - Entries ranked by means

EARLY HARVEST - Fresh Market Merit Scores

	Entry	Mean	2017	2016	2015
1	POR12NCK50-1	**3.4**	3.4	-	-
2	Russet Norkotah	**2.5**	4.3	1.6	1.8
3	A10021-5TE	**2.4**	2.4	-	-
4	A07769-4	**2.4**	2.4	-	-
5	A07098-4	**2.2**	2.2	-	-
6	AOR06576-1	**2.1**	1.2	3.1	-
7	A07705-4	**2.1**	2.1	-	-
8	AOR07821-1	**2.0**	2.3	1.7	-
9	A08422-4VRsto	**1.8**	1.8	-	-
10	A071012-4BF	**1.7**	1.9	1.5	-
11	A08422-2VRsto	**1.6**	1.4	1.9	-
12	Ranger Russet	**1.6**	1.3	2.2	1.4
13	A07088-6	**1.5**	1.5	1.5	-
14	A08510-1LB	**0.9**	0.9	-	-
15	Russet Burbank	**0.8**	1.1	0.9	0.6

LATE HARVEST - Fresh Market Merit Scores

	Entry	Mean	2017	2016	2015
1	Russet Norkotah	**2.6**	2.5	2.9	2.4
2	AOR06576-1	**2.4**	2.4	2.4	-
3	A07769-4	**2.2**	2.2	-	-
4	A07705-4	**2.1**	2.1	-	-
5	POR12NCK50-1	**1.9**	1.9	-	-
6	Ranger Russet	**1.8**	0.9	2.7	1.7
7	A071012-4BF	**1.7**	1.8	1.7	-
8	AOR07821-1	**1.6**	1.2	1.9	-
9	A07098-4	**1.4**	1.4	-	-
10	A08422-2VRsto	**1.2**	1.2	1.3	-
11	Russet Burbank	**1.1**	0.9	1.2	1.3
12	A10021-5TE	**0.9**	0.9	-	-
13	A08510-1LB	**0.7**	0.7	-	-

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
2013-2017

(5 = best) - Entries ranked by means

EARLY HARVEST - Fresh Market Merit Scores

	Entry	Mean	2017	2016	2015	2014	2013
1	AO06191-1*	**3.9**	4.6	3.4	3.4	4.0	-
2	Russet Norkotah	**2.7**	5.0	2.5	1.7	2.3	2.0
3	CO08065-2RU	**2.7**	2.7	-	-	-	-
4	Ranger Russet	**2.6**	3.1	2.8	2.7	2.6	1.7
5	CO08231-1RU	**2.5**	2.5	-	-	-	-
6	A03141-6	**2.4**	2.5	2.4	2.3	2.2	2.8
7	AOR07781-5	**2.3**	2.4	2.3	-	-	-
8	A08433-4VR	**2.1**	2.1	-	-	-	-
9	A08009-2TE	**2.1**	2.1	2.3	2.0	-	-
10	TX08352-5Ru	**2.0**	1.0	2.2	2.8	-	-
12	CO08155-2RU/Y	**1.8**	1.8	-	-	-	-
13	A06030-23	**1.7**	1.5	0.5	3.1	-	-
14	AOR06070-1KF	**1.5**	1.4	1.6	1.6	1.3	1.4
15	A07061-6	**1.4**	0.7	2.1	-	-	-
16	AO03123-2	**1.3**	0.9	0.9	1.2	2.0	1.5
17	COTX09022-3RuRE/Y	**1.3**	1.6	2.0	0.3	-	-
18	Russet Burbank	**1.1**	1.0	0.9	1.3	0.9	1.2

*Shatter bruise on AO06191-1 may be a concern

LATE HARVEST - Fresh Market Merit Scores

	Entry	Mean	2017	2016	2015	2014	2013
1	Russet Norkotah	**2.4**	2.6	2.5	2.5	3.5	1.0
2	A08009-2TE	**2.4**	1.6	3.0	2.5	-	-
3	AO03123-2	**2.3**	3.0	1.9	2.3	1.1	3.5
4	AO06191-1	**2.3**	1.6	4.4	1.8	1.5	-
5	TX08352-5Ru	**2.3**	2.4	2.5	1.9	-	-
6	AOR07781-5	**2.2**	1.4	3.0	-	-	-
7	A07061-6	**2.1**	2.0	2.1	-	-	-
8	A08433-4VR	**1.9**	1.9	-	-	-	-
9	A06030-23	**1.8**	1.7	0.8	2.9	-	-
10	AOR06070-1KF	**1.6**	1.4	2.0	1.9	1.4	1.4
11	A03141-6	**1.5**	0.9	1.7	1.5	1.4	2.1
12	Ranger Russet	**1.4**	1.0	2.2	1.8	1.3	0.9
13	CO08231-1RU	**1.1**	1.1	-	-	-	-
14	CO08155-2RU/Y	**1.0**	1.0	-	-	-	-
15	COTX09022-3RuRE/Y	**0.9**	1.3	1.4	0.1	-	-
16	Russet Burbank	**0.9**	0.9	1.3	1.4	0.4	0.6
17	CO08065-2RU	**0.9**	0.9	-	-	-	-

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

PROCESS MARKET MERIT - NEWEST LINES
2015-2017

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

EARLY HARVEST - Process Market Merit Scores

	Entry	Field Performance Mean	Field Performance Only* 2017	2016	2015
1	A10021-5TE	**4.7**	4.7	-	-
2	A07769-4	**4.5**	4.5	-	-
3	Shepody	**4.1**	5.0	4.3	2.9
4	A08422-4VRsto	**4.0**	4.0	-	-
5	POR12NCK50-1	**3.7**	3.7	-	-
6	A07098-4	**3.5**	3.5	-	-
7	Ranger Russet	**3.5**	3.7	2.7	4.0
8	AOR07821-1	**3.2**	3.5	2.9	-
9	A08422-2VRsto	**2.9**	2.7	3.0	-
10	A07088-6	**2.9**	3.3	2.4	-
11	AOR06576-1	**2.8**	2.2	3.3	-
12	A07705-4	**2.7**	2.7	-	-
13	Russet Norkotah	**2.7**	3.4	2.0	2.6
14	A071012-4BF	**2.6**	2.2	3.0	-
15	Russet Burbank	**2.5**	3.4	2.6	1.3
16	A08510-1LB	**2.3**	2.3	-	-

*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							
		All Years (Washington only)		2017		2016		2015	
	Entry	Field Mean	WA Post Harvest Mean	Field	Post Harv	Field	Post Harv	Field	Post Harv
1	A07769-4	**4.6**	**2.6**	4.6	2.6	-	-	-	-
2	A07705-4	**4.3**	**na**	4.3	na	-	-	-	-
3	Ranger Russet	**3.6**	**3.6**	3.1	2.6	3.8	3.9	4.1	4.4
4	A07098-4	**3.4**	**2.8**	3.4	2.8	-	-	-	-
5	AOR06576-1	**3.2**	**2.1**	3.2	na	3.3	2.1	-	-
6	POR12NCK50-1	**3.2**	**2.9**	3.2	2.9	-	-	-	-
7	AOR07821-1	**2.9**	**2.5**	4.1	1.7	1.8	3.3	-	-
8	A071012-4BF	**2.7**	**1.8**	2.4	1.7	3.0	1.8	-	-
9	A08422-2VRsto	**2.6**	**2.3**	2.4	1.7	2.9	2.8	-	-
10	Russet Burbank	**2.4**	**2.3**	2.7	2.2	3.1	2.4	1.3	2.2
11	A10021-5TE	**2.3**	**3.4**	2.3	3.4	-	-	-	-
12	A08510-1LB	**1.6**	**2.8**	1.6	2.8	-	-	-	-
13	Russet Norkotah	**1.5**	**na**	1.5	na	-	-	-	-

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
2013-2017

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

EARLY HARVEST - Process Market Merit Scores

	Entry	Field Performance Mean	Field Performance Only* 2017	2016	2015	2014	2013
1	A03141-6	**4.0**	5.0	3.9	4.3	4.4	2.4
2	AOR07781-5	**3.7**	4.9	2.5	-	-	-
3	AO06191-1	**3.6**	3.2	3.9	3.6	-	-
4	Shepody	**3.5**	3.4	4.3	3.4	3.8	2.6
5	Ranger Russet	**3.2**	2.7	2.6	3.6	4.3	2.7
6	AOR06070-1KF	**3.1**	2.9	2.8	4.0	3.1	2.7
7	Russet Norkotah	**3.0**	4.0	3.1	3.3	2.6	2.0
8	TX08352-5Ru	**2.9**	1.5	4.3	2.8	-	-
9	A08009-2TE	**2.8**	1.6	3.5	3.4	-	-
10	A08433-4VR	**2.8**	2.8	-	-	-	-
11	AO03123-2	**2.3**	1.5	1.8	3.6	2.4	2.2
12	CO08155-2RU/Y	**2.2**	2.2	-	-	-	-
13	A07061-6	**2.1**	1.1	3.2	-	-	-
14	COTX09022-3RuRE/Y	**2.0**	2.9	2.3	0.8	-	-
15	CO08231-1RU	**1.9**	1.9	-	-	-	-
16	CO08065-2RU	**1.9**	1.9	-	-	-	-
17	Russet Burbank	**1.8**	1.6	2	2.9	1.3	1.4
18	A06030-23	**1.7**	1.0	1.3	2.8	-	-

*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											
		All Years (Washington only)		2017		2016		2015		2014		2013	
		Field	WA Post Harvest	Field	Post Harv	Field	Post Harv	Field	Post Harv	Field	Post Harv	Field	Post Harv
	Entry	Mean	Mean										
1	A03141-6	**4.0**	**4.0**	2.7	2.8	3.9	3.5	4.1	4.7	4.5	4.3	4.6	4.5
2	A08433-4VR	**3.7**	**2.0**	3.7	2.0	-	-	-	-	-	-	-	-
3	A08009-2TE	**3.7**	**na**	3.7	na	-	-	-	-	-	-	-	-
4	Ranger Russet	**3.6**	**3.4**	2.9	2.4	4.6	3.2	3.8	4.9	2.5	2.8	4.4	3.8
5	AO03123-2	**3.5**	**3.9**	2.2	2.9	4.2	3.8	3.5	4.7	2.9	3.5	4.7	4.6
6	AOR07781-5	**3.2**	**3.4**	2.4	2.8	4.0	4.0	-	-	-	-	-	-
7	AO06191-1	**3.1**	**3.7**	2.8	3.0	4.0	3.0	2.4	4.7	3.1	3.9	-	-
8	AOR06070-1KF	**3.0**	**3.7**	2.0	2.9	3.7	3.7	3.7	4.3	3.1	3.8	2.8	4.0
9	A06030-23	**2.4**	**4.4**	2.1	4.1	1.7	4.3	3.4	4.9	-	-	-	-
10	A07061-6	**2.3**	**2.6**	3.3	2.4	1.3	2.8	-	-	-	-	-	-
11	Russet Burbank	**2.1**	**2.2**	3.2	2.3	3.2	2.2	1.2	2.7	1.2	2.0	1.7	1.9
12	CO08065-2RU	**1.7**	**3.1**	1.7	3.1	-	-	-	-	-	-	-	-
13	CO08231-1RU	**1.6**	**na**	1.6	na	-	-	-	-	-	-	-	-
14	CO08155-2RU/Y	**1.6**	**2.4**	1.6	2.4	-	-	-	-	-	-	-	-
15	TX08352-5Ru	**1.6**	**2.3**	1.2	na	2.1	na	1.5	2.3	-	-	-	-
16	Russet Norkotah	**1.3**	**na**	1.3	na	-	-	-	-	-	-	-	-
17	COTX09022-3RuRE/Y	**0.9**	**na**	1.0	na	1.6	na	0.2	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.

	Range of Tuber Sizes for Each Package Type and USDA Grade		Four Year WA State Columbia Basin	Pack-Shed Fee: Packaging	
Markets/Packaging[a]	U.S. No. 1[b]	U.S. No. 2	Average Prices[c]	and Handling	Adjusted Value
50 lb cartons	oz	oz	$/CWT	$/CWT	$/CWT
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
10 lb Film Bags					
Non-size A	4 to 7		$9.15	$4.00	$5.15
100 lb Burlap Sacks					
10 oz Min. Size U.S. No. 2		10 to 20	$8.60	$4.00	$4.60
10 oz Min. Size U.S. No. 2	18 to 20		$8.60	$4.00	$4.60
Bulk					
Process-Culls	< 4	< 10	$4.00	$4.00	$0.00
Process-Culls	> 20	> 20	$4.00	$4.00	$0.00

[a]Count = tuber number per 50 lb carton.

[b]18 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.

[c]Sales 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.

2017 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
Blocky	1.25	70.3	51.6
	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.

Photovolt	USDA color
>31	0
25-30	1
20-24	2
15-19	3
<14	4

Rating	Photovolt reading
5 =	41 or higher
4 =	36 thru 40
3 =	31 thru 35
2 =	25 thru 30
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 20 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 2016 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.

2017 Early Harvest Tri-State Trial

Location: WSU Research Center – Othello, WA
Planting Date: April 3 Vine Kill Date: July 20
Harvest Date: July 31 Days Grown: 108

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 2017 trial compared 4 local reference varieties to 12 new clones. The following is a summary of the Washington field and post-harvest results. See also: grading comments and merit scores near front of book

Fresh Market Standout(s): POR12NCK50-1
Process Market Standout(s): A10021-5TE

Standcounts

- **40 Day**
  Slow emergence: A08422-4VRSto (4%), A08510-1LB and A10021-5TE (7%).
  Best emergence: Ranger Russet (89%), A071012-4BF (64%).

- **50 Day**
  Slow emergence: A08422-2VRsto, Shepody, and A08510-1LB (73%).
  Best emergence: Ranger Russet (96%) and AOR06576-1 (98%).

- **60 Day**
  Poor emergence: All varieties were above (96%).

Plant and Tuber Growth & Development

- **Above Ground Stem Number Per Plant**
  Most: A10021-5TE (2.9) and A07769-4 (2.7).
  Least: A08422-4VRsto and A08422-2VRsto (1.7).

- **Average Tuber Number Per Plant**
  Most: A07705-4 (10.9), A08510-1LB (10.7), and AOR06576-1 (10.6).
  Least: Shepody (6.0), A071012-4BF (7.0), and Ranger Russet (7.1).

- **Average Tuber Size (oz)**
  Largest: Shepody (8.9), A08422-4VRsto (7.7), and A071012-4BF (7.3).
  Smallest: A08510-1LB (4.1); A07705-4 (4.8).

- **Undersized Tubers (< 4oz)**
  Most: A08510-1LB and A07705-4.
  Fewest: Shepody and A08422-4VRsto.

Yield and Economic Data

- **Total Yield and U.S. #1 Yield**
  Highest: A07098-4 had the highest total yield (595 CWT/A) and the U.S. #1 yield (509 CWT/A). A07769-4 had the second highest total yield (579 CWT/A) the second highest U.S. #1 yield (493 CWT/A).
  Lowest: A08510-1LB had the lowest total yield (416 CWT/A) and the U.S. #1 yield (234 CWT/A). Ranger Russet had the second lowest total yield (439 CWT/A); and Russet Burbank had the second lowest U.S. #1 yield (294 CWT/A).

- **% U.S. #1's (greater than 4 oz)**
  Highest: A08422-4VRsto (91%) and Shepody (89%).
  Lowest: A08510-1LB (56%); Russet Burbank (59%) and A07705-4 (70%).

- **Carton Yield (100 to 50 Count (7 to 18 oz U.S. #1 Tubers))**
  Highest: Shepody (21.1 Tons/A) and A08422-4VRsto (19.9 Tons/A).
  Lowest: A08510-1LB (4.8 Tons/A).

- **Gross Return ($/acre)**
  Fresh Market Highest: A08422-4VRsto and A10021-5TE.
  Fresh Market Lowest: A08510-1LB, A07705-4, and A08422-2VRsto.
  Process Market Highest: A07098-4, A07769-4, and A08422-4VRsto.

Tuber Defects (30 tuber sample of 8-12 oz tubers)

- **External Defects**
  Notable Defects: Russet Burbank had 6% knobs. Most entries had little to no external defects.

- **Internal Defects**
  Notable Defects: Russet Burbank had 3% brown center, most entries had little to no internal defects.

- **Bruise**
  Highest Blackspot: Russet Burbank (3%).
  Highest Shatter: AOR07821-1 (24%) and A08422-4VRsto (19%).

2017 Early Harvest Tri-State Trial

Summaries

ENTRY	TOTAL YIELD			US # 1's* > 4 oz	US # 2's* > 4 oz	Culls* & < 4 oz	CARTON YIELD 100-50 count (US 1's 7-18 oz)		PROCESS YIELD US 1's and 2's > 6 oz	
	CWT/A	STATS**	Tons/A	% of Total Yield			% of Total Yield	Tons/A	% of Total Yield	Tons/A
Ranger Russet	439	*FG*	22.0	76	10	14	37	8.1	63	13.9
Russet Burbank	501	*CDEF*	25.1	59	13	29	34	8.5	54	13.6
Russet Norkotah	549	*ABCD*	27.5	88	2	11	48	13.2	65	17.8
Shepody	503	*BCDEF*	25.1	89	4	8	60	15.0	83	21.1
A07088-6	494	*CDEF*	24.7	79	2	19	37	9.2	48	11.9
A07098-4	595	*A*	29.8	85	2	13	46	13.6	62	18.5
A071012-4BF	478	*DEFG*	23.9	85	3	12	55	13.1	69	16.4
A07705-4	502	*CDEF*	25.1	70	1	29	25	6.3	39	9.7
A07769-4	579	*AB*	29.0	85	1	14	48	13.8	64	18.7
A08422-2VRsto	468	*EFG*	23.4	74	0	26	27	6.2	40	9.3
A08422-4VRsto	540	*ABCDE*	27.0	91	0	8	65	17.6	74	19.9
A08510-1LB	416	*G*	20.8	56	0	44	17	3.6	23	4.8
A10021-5TE	569	*ABC*	28.5	84	3	13	52	14.9	66	18.9
AOR06576-1	518	*BCDE*	25.9	76	2	23	25	6.5	38	9.9
AOR07821-1	535	*ABCDE*	26.8	76	6	18	43	11.4	59	15.9
POR12NCK50-1	473	*DEFG*	23.7	79	1	19	42	10.0	55	13.2

ENTRY	US # 1 YIELD						> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%) (8-12 oz tubers)		
	> 4 oz CWT/A	STATS**	> 4 oz Tons/A	4-7 oz*	7-14 oz*	> 14 oz*		% HH	% BC	% IBS
				%						
Ranger Russet	334	*EF*	16.7	50	46	4	1.097	0	0	0
Russet Burbank	294	*FG*	14.7	39	52	9	1.089	0	3	0
Russet Norkotah	481	*ABC*	24.1	44	50	6	1.097	0	0	0
Shepody	448	*ABCD*	22.4	19	54	27	1.091	0	0	0
A07088-6	392	*DE*	19.6	53	44	3	1.099	0	0	0
A07098-4	509	*A*	25.4	46	52	3	1.082	0	0	0
A071012-4BF	407	*CDE*	20.4	35	53	12	1.097	0	0	0
A07705-4	349	*EF*	17.5	62	36	3	1.074	0	0	0
A07769-4	493	*AB*	24.7	44	56	0	1.079	0	0	0
A08422-2VRsto	346	*EF*	17.3	63	35	2	1.081	0	0	0
A08422-4VRsto	493	*AB*	24.7	28	65	7	1.087	2	2	0
A08510-1LB	234	*G*	11.7	70	30	0	1.086	0	0	0
A10021-5TE	480	*ABC*	24.0	38	55	7	1.086	0	0	0
AOR06576-1	392	*DE*	19.6	67	33	0	1.099	0	2	0
AOR07821-1	409	*BCDE*	20.4	44	51	5	1.096	0	2	0
POR12NCK50-1	376	*DEF*	18.8	47	50	3	1.093	0	0	0

ENTRY	40 DAY STAND	50 DAY STAND	60 DAY STAND	STEMS PER PLANT	AVERAGE TUBER WEIGHT	AVERAGE TUBER NUMBER	SKIN SET 1 = Poor	TUBER SHAPE 1 = Round	BRUISE (%) (8-12 oz tubers)	
	% Emerged	% Emerged	% Emerged	Above Ground	Ounces	Tubers/Plant	5 = Good	5 = Long	BLACKSPOT	SHATTER
Ranger Russet	89	96	98	2.1	6.4	7.1	3	3	2	2
Russet Burbank	49	82	100	2.1	6.4	8.6	3	3	3	0
Russet Norkotah	62	84	98	2.3	6.5	8.8	3	4	0	0
Shepody	38	73	100	1.9	8.9	6.0	3	3	0	0
A07088-6	53	96	100	2.4	5.9	8.8	3	2	0	2
A07098-4	16	89	100	2.5	6.3	9.8	3	2	0	6
A071012-4BF	64	93	100	2.0	7.3	7.0	3	2	0	2
A07705-4	16	91	96	2.5	4.8	10.9	3	3	0	0
A07769-4	9	82	100	2.7	6.3	9.6	3	3	0	3
A08422-2VRsto	13	73	98	1.7	5.0	9.7	4	3	0	0
A08422-4VRsto	4	82	98	1.7	7.7	7.4	3	2	0	19
A08510-1LB	7	73	96	2.6	4.1	10.7	3	3	0	0
A10021-5TE	7	84	100	2.9	6.7	8.8	3	4	0	7
AOR06576-1	24	98	100	2.6	5.1	10.6	2	3	2	0
AOR07821-1	11	84	96	2.3	6.2	9.0	4	3	2	24
POR12NCK50-1	11	89	100	2.4	5.7	8.6	3	4	2	0

* Percent values may not total 100% due to rounding

2017 Seed Lot Disease Readings

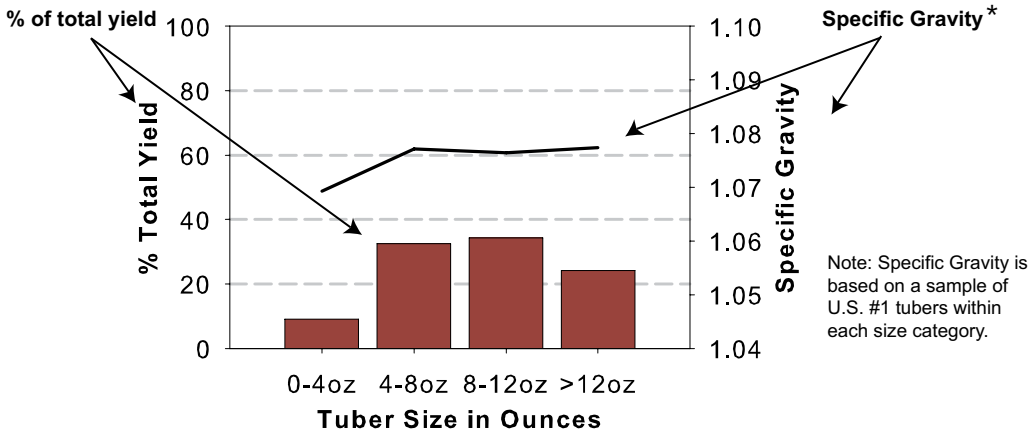




2017 Early Harvest Tri-State Trial

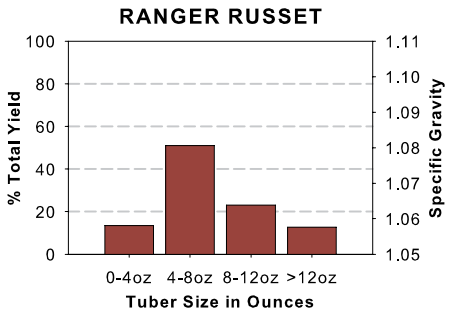
Tuber Yield and Specific Gravity Distributions

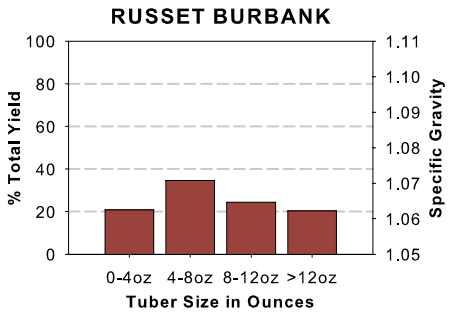
12 inch In-Row Spacing

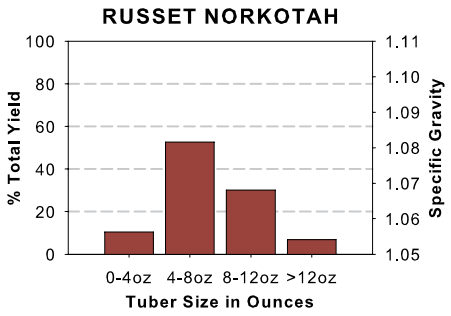


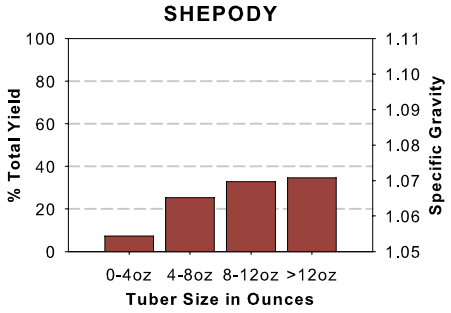
Note: Specific Gravity is based on a sample of U.S. #1 tubers within each size category.

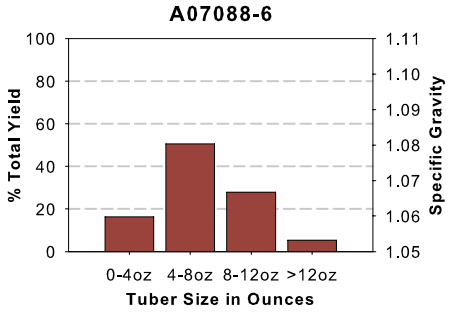
*Specific Gravities data missing from graphs as only one size was tested in 2017.

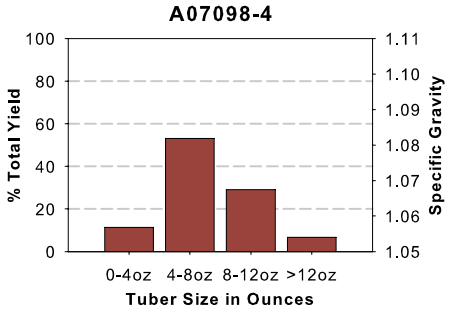


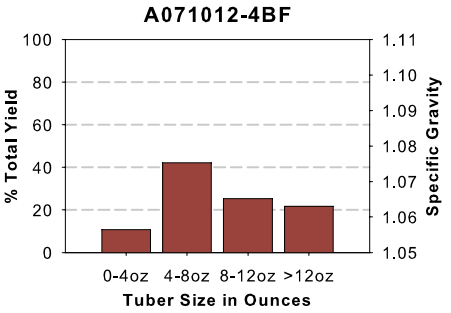


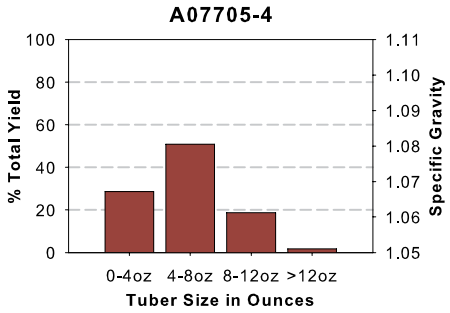


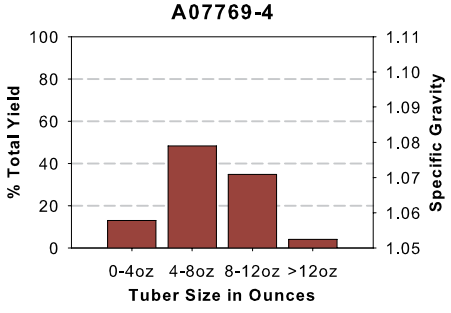


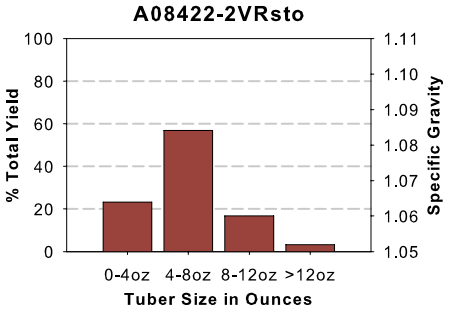


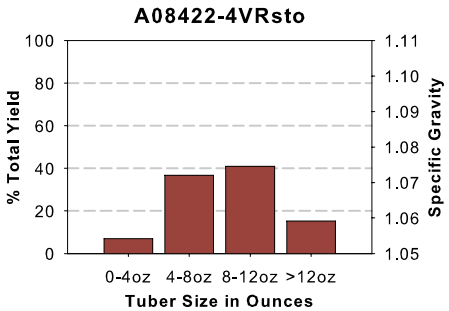


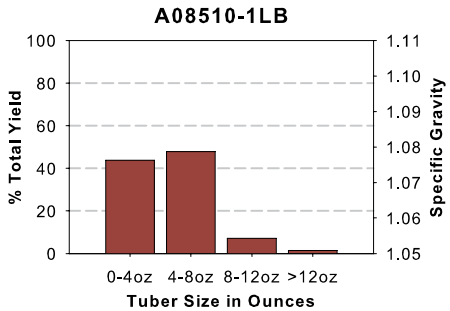


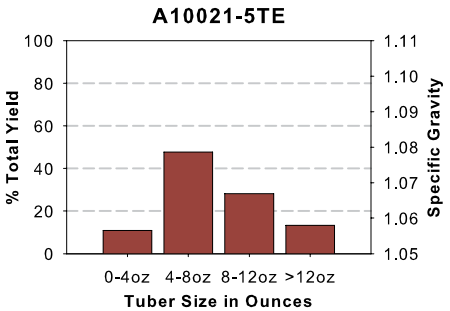


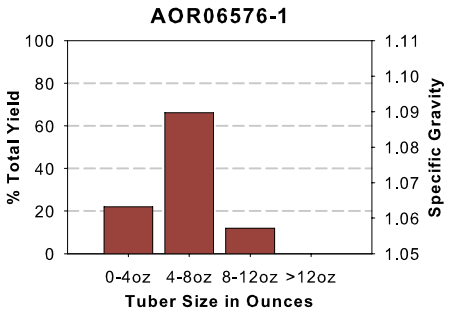


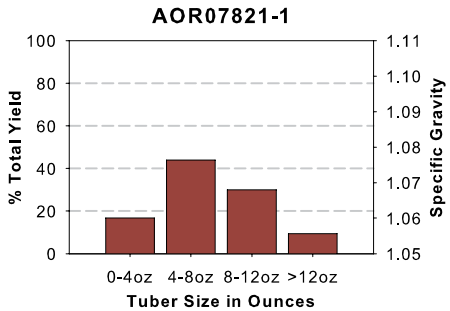

A08422-2VRsto
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces

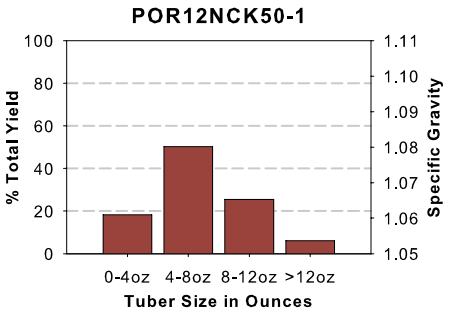

A08422-4VRsto
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces

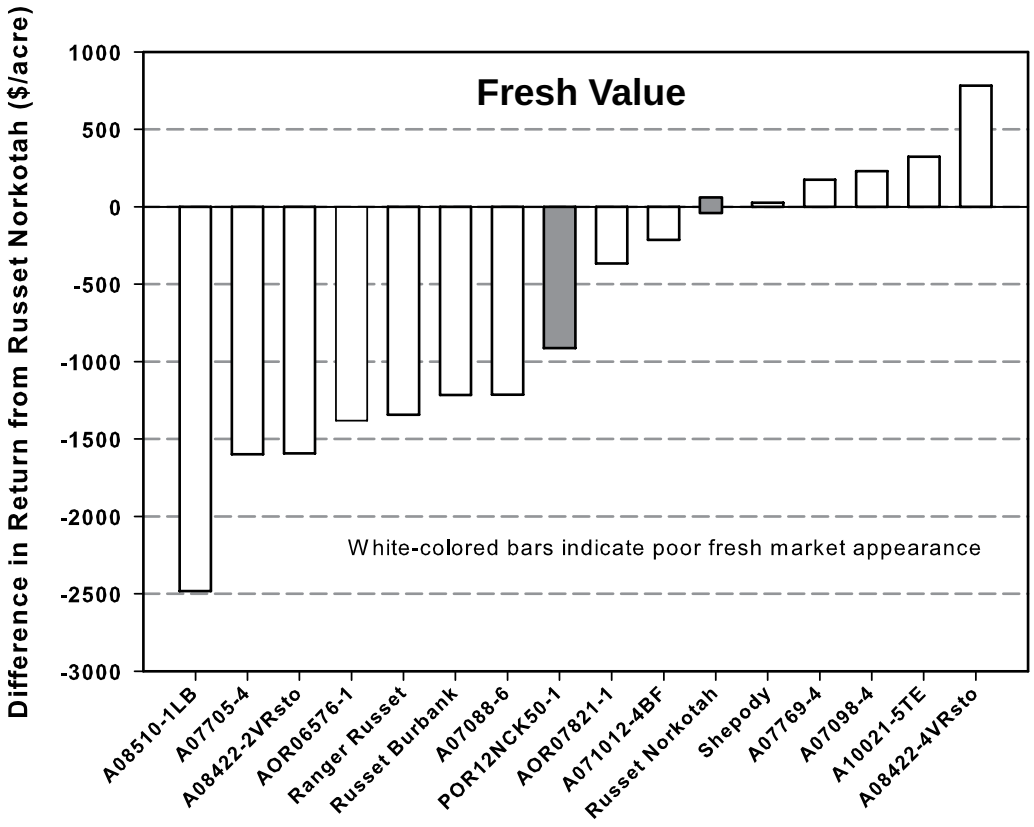

A08510-1LB
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


A10021-5TE
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


AOR06576-1
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


AOR07821-1
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


POR12NCK50-1
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces



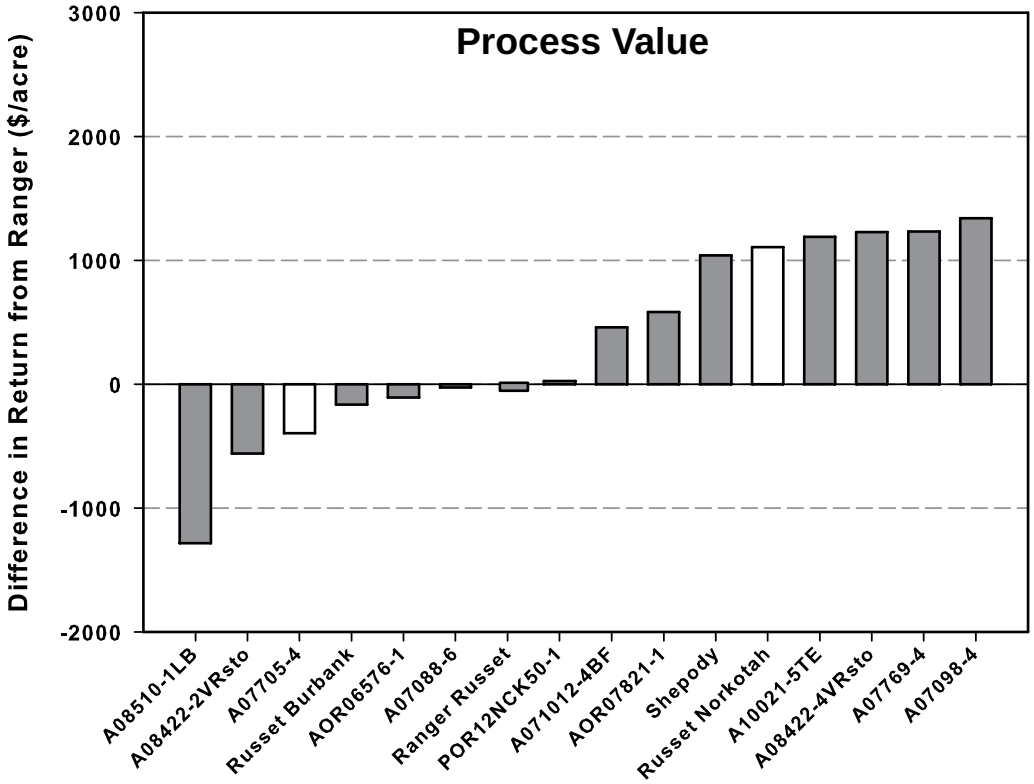


Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry.
Figure 2 (Bottom). Difference in gross return per acre (Process Market) from Ranger Russet calculated by 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.

2017 Early Harvest Tri-State Trial

Tubers

Ranger Russet

A07098-4

A08422-2VRsto

AOR06576-1

Russet Burbank

A071012-4BF

A08422-4VRsto

AOR07821-1

Russet Norkotah

A07705-4

A08510-1LB

POR12NCK50-1

Shepody

A07769-4

A10021-5TE

A07088-6

2017 Late Harvest Tri-State Trial

Location: WSU Research Center – Othello, WA
Planting Date: April 5 Vine Kill Date: September 1
Harvest Date: September 11 Days Grown: 149

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): Russet Norkotah
Process Market Standout(s): Ranger Russet

Standcounts

- **40 Day**
  Slow emergence: A08510-1LB (6%).
  Best emergence: Ranger Russet (69%).

- **50 Day**
  Slow emergence: A08510-1LB (31%).
  Best emergence: A07705-4 (95%).

- **60 Day**
  Full emergence: POR12NCK50-1, A07705-4, and A07769-4 were 100%.
  Best emergence: All other entries were at least 91% at 50 DAP.

Plant and Tuber Growth & Development

- **Above Ground Stem Number Per Plant**
  Most: A07705-4 and A10021-5TE (2.9).
  Least: A08422-2VRsto (1.5).

- **Average Tuber Number Per Plant**
  Most: A07705-4 (10.4) and A07098-4 (8.8).
  Least: Ranger Russet (6.8) and A10021-5TE (7.0).

- **Average Tuber Size (oz)**
  Largest: AOR07821-1 (10.6), A071012-4BF (10.4).
  Smallest: A08510-1LB (6.9) and A07098-4 (8.4).

- **Undersized Tubers (< 4 oz)**
  Most: A08510-1LB and A07705-4.
  Least: A071012-4BF and A07769-4.

Yield and Economic Data

- **Total and US #1**
  Highest: A07705-4 had the highest total yield (1027 CWT/A) and the highest US #1 yield (946 CWT/A). A07769-4 had the second highest total yield (969 CWT/A) and the second highest US #1 yield (906 CWT/A).
  Lowest: A08510-1LB had the lowest total yield (670 CWT/A) and the lowest US #1 yield (575 CWT/A).

- **% U.S. #1's Greater Than 4 oz.**
  Highest: A07769-4 (93%), A07705-4 (92%).
  Lowest: Ranger Russet (82%), Russet Burbank (86%), and A08510-1LB (86%).

- **Carton Yield (100 to 50 Count (7 to 18 oz US #1 Tubers))**
  Highest: A07769-4 (35.7 Tons/A), A07705-4 (33.9Tons/A).
  Lowest: A08510-1LB (17.8 Tons/A), Ranger Russet (19.7 Tons/A).

- **Gross Return ($/acre)**
  Fresh Market Highest: A07769-4, A07705-4, and A07098-4.
  Fresh Market Lowest: A08510-1LB, Ranger Russet, and Russet Burbank.
  Process Market Highest: A07705-4, A07769-4, and AOR07821-1.
  Process Market Lowest: A08510-1LB, Russet Norkotah, and Ranger Russet.

Tuber Defects (40 tuber sample of 8-12 oz tubers)

- **External Defects**
  Notable Defects: Russet Burbank had 5% tubers with knobs. All other entries had little to no external defects.

- **Internal Defects**
  Notable Defects: A08422-2VRsto had 8% internal brown spot and Russet Burbank had 5% hollow heart. Most entries were relatively free of internal defects.

- **Bruise**
  Highest Blackspot: Russet Burbank, A07098-4, and POR12NCK50-1 (5%).
  Lowest Blackspot: All other entries were below 5%.
  Highest Shatter: A07769-4 (68%) and AOR07821-1 (67%).
  Lowest Shatter: Ranger Russet (5%) and Russet Norkotah (3%).

2017 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 two cultivars were tested from ID, WA and OR. Overall postharvest merit scores for the clones appear in the Table (next page). Details are summarized below. The asterisks "*" below indicate similar performance and/or ranking in trials from previous years.

- **Overall Postharvest Rating**
  Highest scoring clones: A10021-5TE, A08510-1LB, POR12NCK50-1
  Lowest scoring clones: RB*, A08422-2VRsto

- **Low Temperature Sweetening**
  Most resistant: A10021-5TE, A08510-1LB, A07769-4
  Most susceptible: RB, RR, A08422-2VRsto

- **Taste Panel**
  Highest rated: A10021-5TE, POR12NCK50-1, A08510-1LB
  Lowest rated: RB, A08422-2VRsto

- **Blackspot Bruise Susceptibility**
  Most resistant: A08510-1LB, A07769-4
  Most susceptible: RR*, A071012-4BF, AOR07821-1

- **Variability in Tuber Shape & Fry Yield (8- to 10-oz tubers)**
  Lowest L/W: A08510-1LB, AOR07821-1
  Highest L/W: RB*, RR*, A10021-5TE
  Least variable: A10021-5TE, AOR07821-1
  Most variable: A08510-1LB

Details

- Averaged across states, all entries received higher postharvest scores than Russet Burbank.

- A10021-5TE, A08510-1LB, and POR12NCK50-1 were the highest rated entries, scoring 24.9, 24.6, and 24.3 out of 38 points, respectively. The scores for these top rated entries were lower compared with the top rated entries from past years.

- A10021-5TE, A08510-1LB, and A07769-4 were resistant to cold sweetening, with samples from all states producing highly acceptable light colored fries (USDA 0 after 60 d at 44°F; USDA 2 at 40°F; average of stem ends). However, all 3 entries grown in WA and OR had non-uniform fry color after storage at 48°F. Most entries grown in OR and WA had non-uniform fry color at harvest and after storage (regardless of storage temperature). Growing location had little effect on the change in fry color of A10021-5TE and AOR07821-1 following 60 days of storage at 44°F. By contrast, retention of fry color in RR, A08422-2VRsto*, A071012-4BF*, and A07098-4 was highly variable depending on production site (WA, OR, ID).

- RB*, and A08422-2VRsto received the lowest overall postharvest scores (15.0 and 15.5, respectively).

- Average (across states) gravities of RB, A07769-4, and RR were 1.073, 1.077, and 1.077, respectively; too low for frozen processing contracts. The gravities of the other entries ranged from 1.080 to 1.089 when averaged across states. When averaged across the 10 entries, gravities were 1.074 (OR), 1.083 (ID), and 1.087 (WA).

- A10021-5TE, POR12NCK50-1, and A08510-1LB were the favorites in the taste panels - all 3 entries scored 3.6/5 when averaged across growing locations (5 is best). RB and A08422-2VRsto received the lowest taste panel scores of 3.0 and 3.1, respectively.

- 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*, A071012-4BF, and AOR07821-1 were the most susceptible, scoring 90, 88, and 81% bruise (stem end), respectively, in the controlled impact study. These clones also had the highest bruise severity, averaging 3.6/5. A08510-1LB, and A07769-4 were the most resistant, averaging 18 and 36% bruise (stem end), respectively, and 1.4 and 1.9 severity ratings.

- The 8- to 10-oz tubers of A08510-1LB andAOR07821-1 had low length to width ratios (avg. L/W=1.66), resulting in yields of 3-inch or longer fries averaging only 85% by weight. A08510-1LB had the greatest variation in L/W ratio; usable fry yields ranged from 76 to 94% across production sites. Tuber L/W ratios for A08510-1LB were 1.44 and 1.37 when grown in WA and OR, respectively. RB*, RR*, and A10021-5TE had the highest L/W ratios across all states, resulting in an average of 92% yield of French fries by weight.

- Reconditioning (60°F, 21 days) tubers of A071012-4BF, A08510-1LB, and AOR07821-1 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 A08422-2VRsto and A10021-5TE changed little in response to reconditioning. RB, POR12NCK50-1, A10021-5TE, and A08422-2VRsto 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 of storage at 48°F, 85% of RR tubers were sprouting with an average sprout length of 0.6 inches. On average, 63% of tubers of A07769-4, A071012-4BF, A07098-4, A10021-5TE, and A08510-1LB had 0.3-inch-long sprouts, 37% of tubers of AOR07821-1 had 0.4-inch-long sprouts, and only 7% of RB tubers were peeping.

Overall Tri-State Postharvest Merit Scores

	Postharvest Merit Scores			3 state
Clone	WA	ID	OR	Average
8 A10021-5TE	3.4	4.1	2.4	3.3
7 A08510-1LB	2.8	3.5	3.4	3.2
10 POR12NCK50-1	2.9	3.8	3.0	3.2
5 A07769-4	2.6	3.2	2.8	2.9
4 A071012-4BF	1.7	4.2	2.4	2.8
9 AOR07821-1	1.7	3.8	2.7	2.7
3 A07098-4	2.8	4.2	0.9	2.6
1 Ranger Russet	2.6	No Sample	1.9	2.2
6 A08422-2VRsto	1.7	2.9	1.5	2.0
2 Russet Burbank	2.2	1.8	1.9	2.0

2017 Late Harvest Tri-State Trial

Summaries

ENTRY	TOTAL YIELD			US # 1's* > 4 oz	US # 2's* > 4 oz	Culls* & < 4 oz	CARTON YIELD 100-50 count (US 1's 7-18 oz)		PROCESS YIELD US 1's and 2's > 6 oz	
	CWT/A	STATS**	Tons/A	% of Total Yield			% of Total Yield	Tons/A	% of Total Yield	Tons/A
Ranger Russet	721	*EF*	36.0	82	11	7	66	19.7	82	29.7
Russet Burbank	747	*CDEF*	37.3	85	8	8	69	21.7	82	30.6
Russet Norkotah	724	*DEF*	36.2	92	1	6	70	23.5	80	28.9
A07098-4	845	*B*	42.2	91	2	7	74	28.4	82	34.6
A071012-4BF	851	*B*	42.5	91	6	3	71	27.5	88	37.5
A07705-4	1027	*A*	51.3	92	1	6	72	33.9	82	42.2
A07769-4	969	*A*	48.5	93	2	5	79	35.7	90	43.3
A08422-2VRsto	790	*BCDE*	39.5	88	4	8	82	28.4	86	34.0
A08510-1LB	670	*F*	33.5	86	1	14	62	17.8	67	22.6
A10021-5TE	797	*BCDE*	39.9	90	3	7	67	24.1	82	32.9
AOR06576-1	820	*BCD*	41.0	92	1	7	76	28.6	85	34.7
AOR07821-1	949	*A*	47.4	91	5	5	61	26.1	87	41.4
POR12NCK50-1	807	*BCD*	40.3	92	2	6	73	27.0	86	34.8

ENTRY	US # 1 YIELD						> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%) (8-12 oz tubers)		
	> 4 oz CWT/A	STATS**	> 4 oz Tons/A	4-7 oz*	7-14 oz*	> 14 oz*		% HH	% BC	% IBS
				%						
Ranger Russet	596	*FG*	29.8	21	54	26	1.088	0	0	0
Russet Burbank	632	*EFG*	31.6	21	54	25	1.092	5	0	0
Russet Norkotah	669	*DEF*	33.5	24	55	21	1.075	0	0	0
A07098-4	768	*C*	38.4	22	65	13	1.084	0	0	0
A071012-4BF	774	*C*	38.7	16	51	33	1.099	0	0	0
A07705-4	946	*A*	47.3	21	59	20	1.082	0	0	3
A07769-4	906	*AB*	45.3	11	59	29	1.083	0	0	0
A08422-2VRsto	694	*CDE*	34.7	14	64	22	1.083	0	0	8
A08510-1LB	575	*G*	28.7	33	51	16	1.090	0	0	0
A10021-5TE	716	*CDE*	35.8	16	51	33	1.085	0	0	0
AOR06576-1	756	*C*	37.8	15	61	23	1.080	0	0	0
AOR07821-1	861	*B*	43.0	14	46	40	1.093	0	0	0
POR12NCK50-1	743	*CDE*	37.1	14	55	32	1.090	0	0	0

ENTRY	40 DAY STAND	50 DAY STAND	60 DAY STAND	STEMS PER PLANT	AVERAGE TUBER WEIGHT	AVERAGE TUBER NUMBER	SKIN SET 1 = Poor	TUBER SHAPE 1 = Round	BRUISE (%) (8-12 oz tubers)	
	% Emerged	% Emerged	% Emerged	Above Ground	Ounces	Tubers/Plant	5 = Good	5 = Long	BLACKSPOT	SHATTER
Ranger Russet	69	86	94	2.1	9.2	6.8	4	4	3	5
Russet Burbank	25	85	93	2.2	8.7	7.5	4	3	5	40
Russet Norkotah	30	90	98	2.3	8.6	7.3	4	3	3	3
A07098-4	53	94	95	2.4	8.4	8.8	4	3	5	54
A071012-4BF	41	83	91	2.1	10.4	7.1	4	3	0	10
A07705-4	11	95	100	2.9	8.6	10.4	4	3	0	20
A07769-4	13	93	100	2.8	10.3	8.2	4	3	0	68
A08422-2VRsto	26	94	98	1.5	9.1	7.5	4	2	0	10
A08510-1LB	6	31	94	2.7	6.9	8.5	4	2	0	20
A10021-5TE	8	90	95	2.9	9.9	7.0	4	4	3	21
AOR06576-1	13	88	96	1.9	9.2	7.8	4	4	0	38
AOR07821-1	20	76	94	2.4	10.6	7.8	4	3	3	67
POR12NCK50-1	25	88	100	1.9	9.5	7.4	4	3	5	32

* Percent values may not total 100% due to rounding

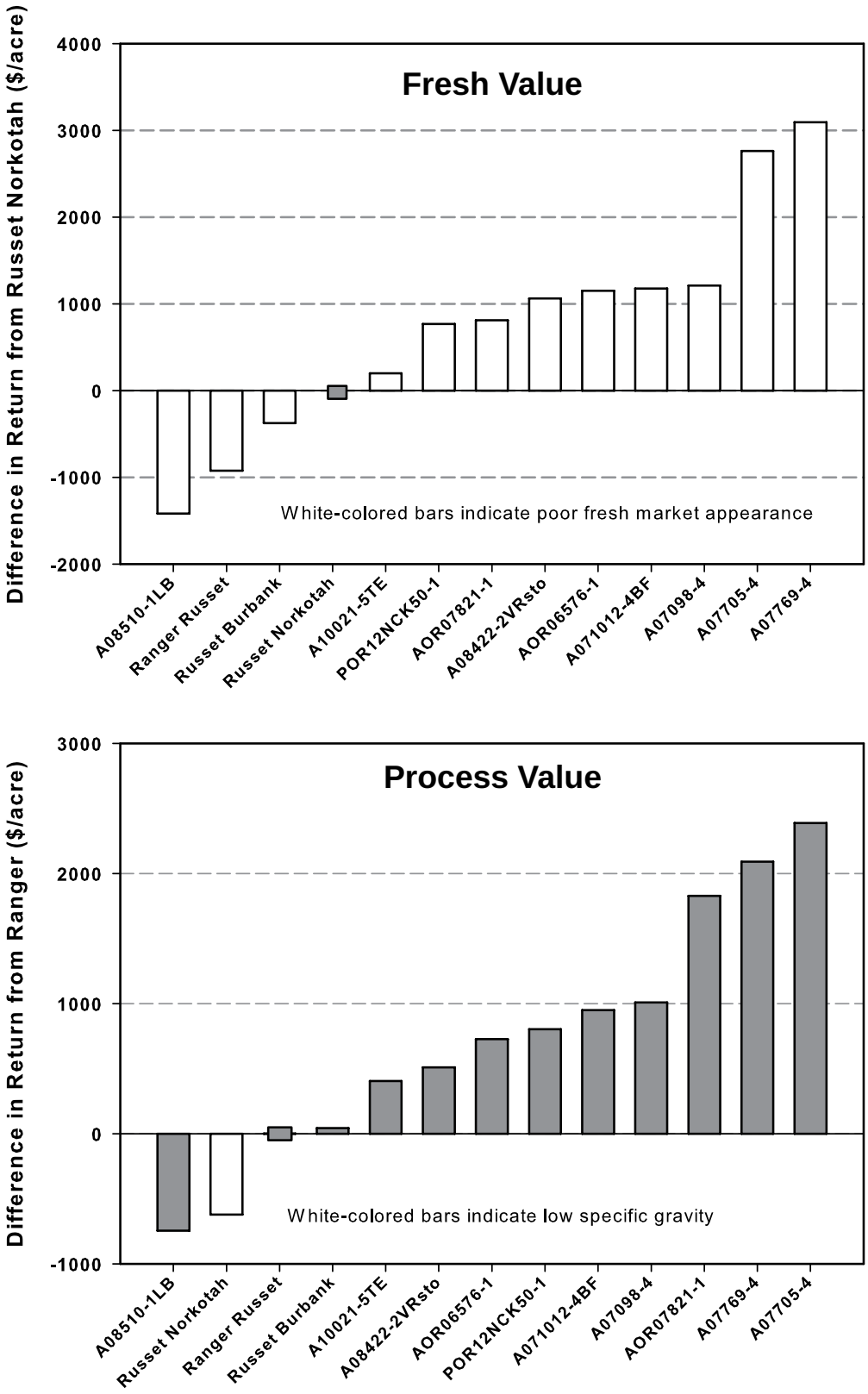
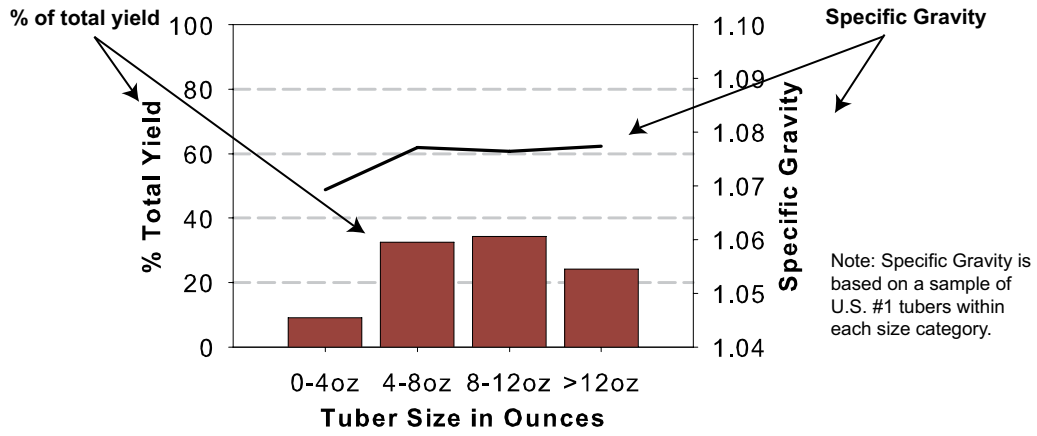


Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to undesirable shape or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

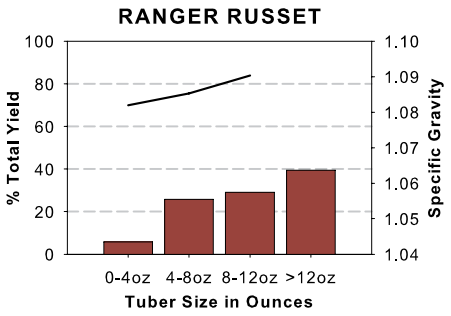
2017 Late Harvest Tri-State Trial

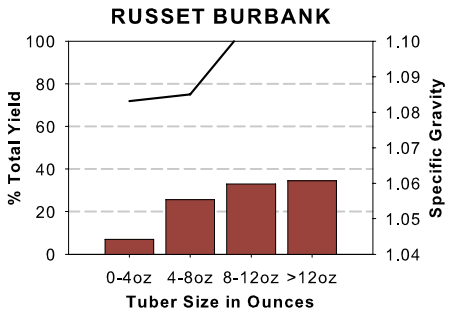
Tuber Yield and Specific Gravity Distributions

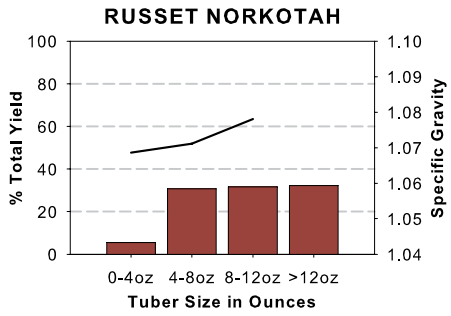
10 inch In-Row Spacing

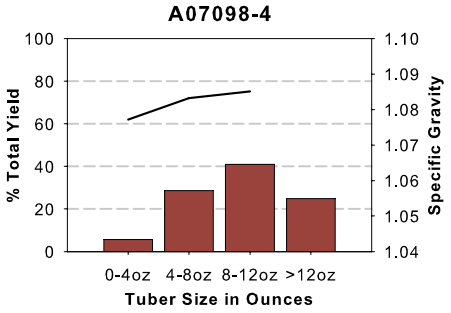


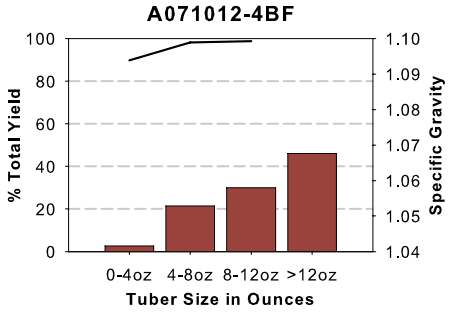
Note: Specific Gravity is based on a sample of U.S. #1 tubers within each size category.

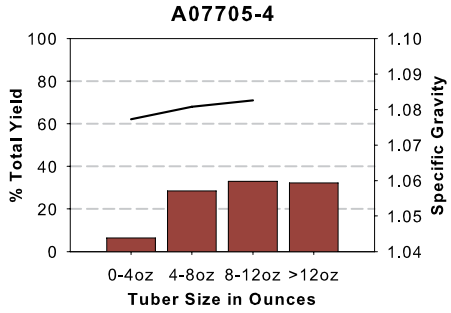


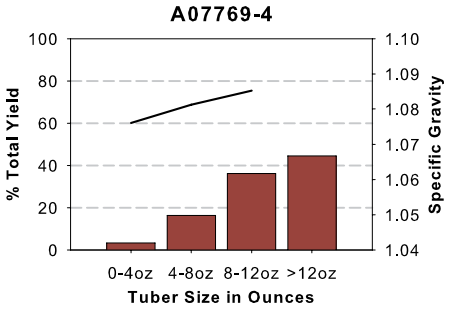


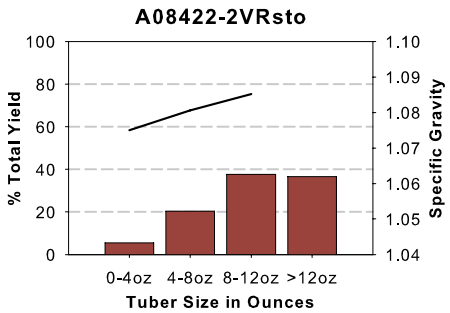


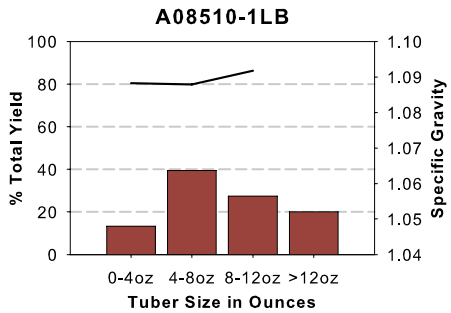


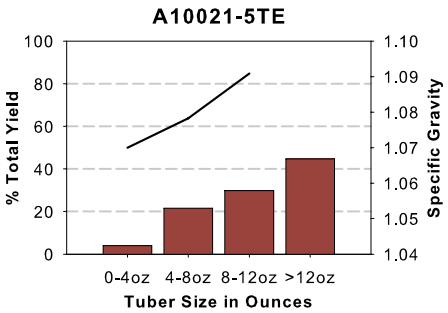


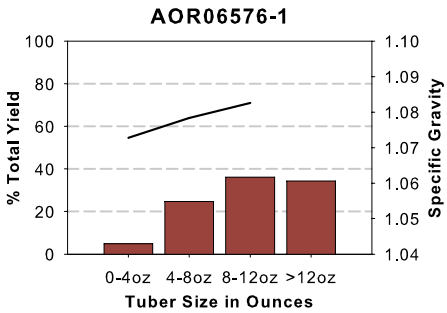


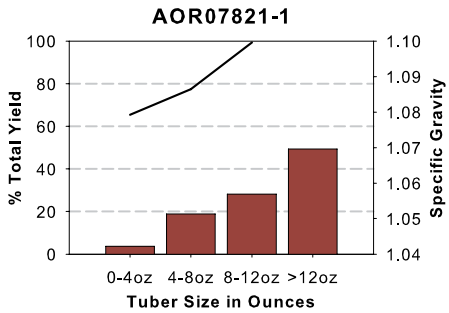


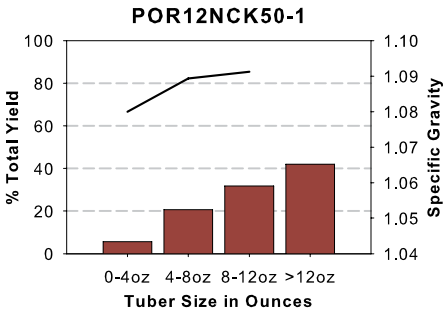





A10021-5TE
% Total Yield
Specific Gravity
100
80
60
40
20
0
1.10
1.09
1.08
1.07
1.06
1.05
1.04
0-4oz
4-8oz
8-12oz
>12oz
Tuber Size in Ounces


AOR06576-1
% Total Yield
Specific Gravity
100
80
60
40
20
0
1.10
1.09
1.08
1.07
1.06
1.05
1.04
0-4oz
4-8oz
8-12oz
>12oz
Tuber Size in Ounces


AOR07821-1
% Total Yield
Specific Gravity
100
80
60
40
20
0
1.10
1.09
1.08
1.07
1.06
1.05
1.04
0-4oz
4-8oz
8-12oz
>12oz
Tuber Size in Ounces


POR12NCK50-1
% Total Yield
Specific Gravity
100
80
60
40
20
0
1.10
1.09
1.08
1.07
1.06
1.05
1.04
0-4oz
4-8oz
8-12oz
>12oz
Tuber Size in Ounces

Tubers	WA Late Harvest Tri-State Trial Comments
Ranger Russet	
	**Tubers:** Oblong to long tubers. Good skin set; moderate eye depth. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = unnaceptably dark, non-uniform; Reconditioned = light, non-uniform.
Russet Burbank	
	**Tubers:** Oblong tubers. Good skin set; moderate eye depth. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnaceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform.
A07098-4	
	**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 = unnaceptably dark, uniform; Reconditioned = unnaceptably dark, uniform.
A071012-4BF	
	**Tubers:** Oblong tubers. Good skin set; shallow eyes. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnaceptably dark, non-uniform; Reconditioned = light, non-uniform.
A07769-4	
	**Tubers:** Oblong tubers. Good skin set; shallow eyes. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = light, non-uniform; Reconditioned = relatively dark, non-uniform.

Initial Fries	48º F Storage	44º F Storage	40º F Storage	40º F Recon.
Ranger Russet				
				
Russet Burbank				
				
A07098-4				
				
A071012-4BF				
				
A07769-4				
				

Tubers	WA Late Harvest Tri-State Trial Comments
A08422-2VRsto	
	**Tubers:** Round to 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, non-uniform; 40°F = unnaceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform.
A08510-1LB	
	**Tubers:** Round to oblong tubers. Good skin set; shallow eyes. **Fry color:** At harvest= light, uniform; 48°F = light, non-uniform; 44°F = light, uniform; 40°F = unnaceptably dark, uniform; Reconditioned = light, non-uniform.
A10021-5TE	
	**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, uniform; Reconditioned = relatively dark, non-uniform.
AOR07821-1	
	**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, non-uniform; 40°F = unnaceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform.
POR12NCK50-1	
	**Tubers:** Oblong tubers. Good skin set; moderate eye depth. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform Reconditioned = relatively dark, non-uniform.

Initial Fries	48º F Storage	44º F Storage	40º F Storage	40º F Recon.
A08422-2VRsto				
				
A08510-1LB				
				
A10021-5TE				
				
AOR07821-1				
				
POR12NCK50-1				
				

2017 Late Harvest Tri-State Trial

Accumulated Total Postharvest Rating of Clones

Clone	WA Rating Total §	WA Discard §§	ID Rating Total §	ID Discard §§	OR Rating Total §	OR Discard §§	3 State av. Rating Total
8 A10021-5TE	25.5		30.8		18.5	Sp. Gr.	24.9
7 A08510-1LB	21.6	40°F	26.5		25.6		24.6
10 POR12NCK50-1	21.7		28.5		22.7		24.3
5 A07769-4	19.7		24.2		21.2	Sp. gr.	21.7
4 A071012-4BF	13.2	40°F	31.7		18.0		21.0
9 AOR07821-1	13.0	40°F	29.0		20.4		20.8
3 A07098-4	21.4	40°F	31.6		6.7	Sp. Gr., 40°F	19.9
1 Ranger Russet	19.4	40°F	No Sample		14.5	Sp. Gr., 40°F	17.0
6 A08422-2VRsto	12.9	40°F	22.1		11.4	Sp. Gr., 40°F	15.5
2 Russet Burbank	17.0	40°F	13.8	Sp. Gr., 40°F	14.1	Sp. Gr., 40°F	15.0
	18.5		26.2		17.3		20.5

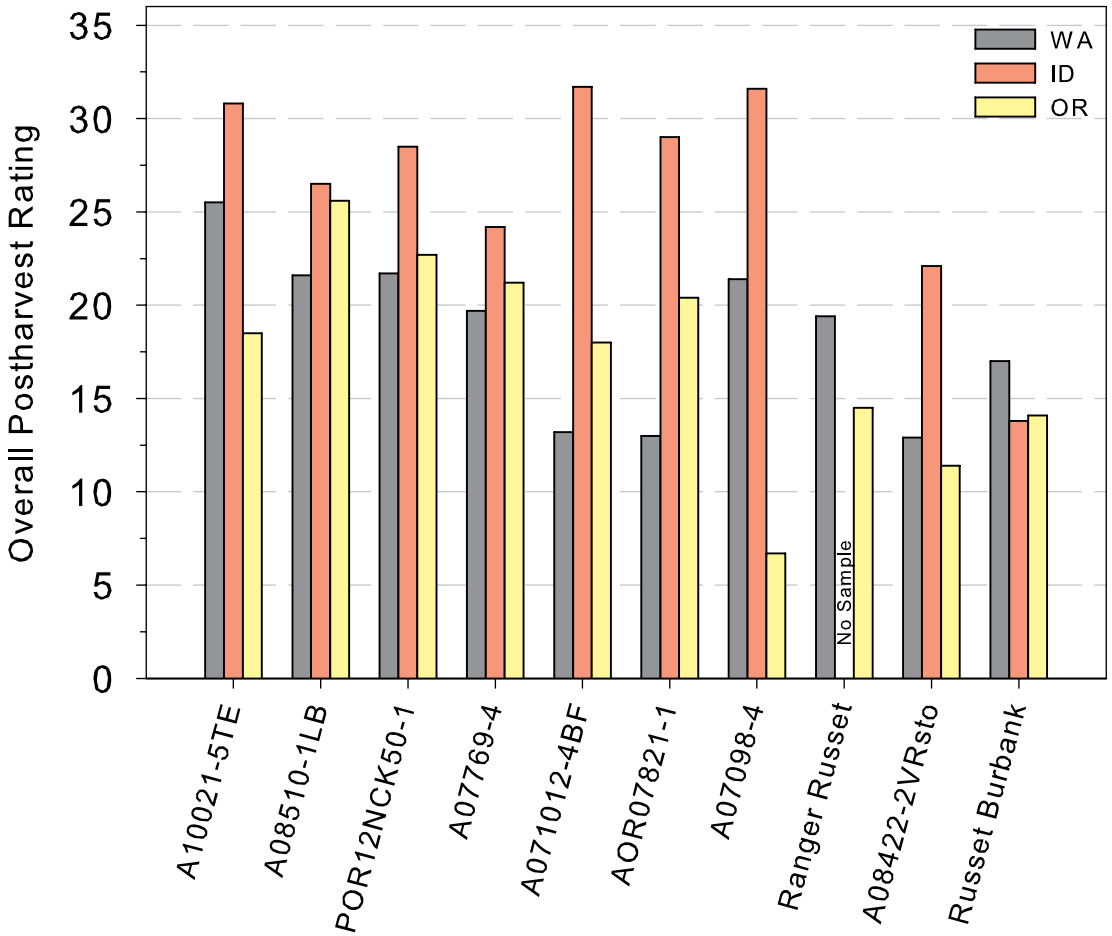
§ maximum rating possible = 38

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

Graduate Student Cody Dean discusses plant emergence differences among cultivars.

2017 Late Harvest Tri-State Trial

Late Harvest Tri-State Postharvest Ratings



2017 Late Harvest Tri-State Trial

Entries Retained from the 2016 Trials Currently in the Tri-State Trial

Harvested fall of 2016
Held at 48° F until December 14, 2017
Stored at 44° F until analysis

A07088-6, A071012-4BF, A08422-2VRsto, and AOR07821-1 were retained from the 2016 Tri-State Trial into the 2017 Trial. When averaged across states, A07088-6 and AOR07821-1 produced the lightest fries (47.5 and 39.3 ref units, respectively). The uniformity of fry color (stem to bud end) was unacceptable for the check cultivars, Ranger Russet and Russet Burbank, in WA. A07088-6 produced non-uniform fry color when grown in OR. AOR07821-1 and A071012-BF produced the shortest sprout lengths, averaging 2.2 and 3.2 inches, respectively, across states. Sprout lengths for the other entries ranged from 4 to 4.7 inches, indicating shorter dormancy than AOR07821-1 and A071012-BF.

	PHOTOVOLT READING				USDA	% REDUCING SUGAR			Sprouting	
Clone	stem	bud	avg	DIFF	COLOR	stem	bud	avg	percent	length (in.)
Washington										
1 Ranger Russet	29.2	39.3	34.3	10.0	1	1.5	0.8	1.1	100	5.5
2 Russet Burbank	34.0	46.3	40.1	12.2	0	1.1	0.5	0.8	100	4.5
3 A07088-6	43.6	47.9	45.8	4.4	0	0.6	0.5	0.6	100	4.5
4 A071012-4BF	32.1	36.4	34.2	7.9	0	1.2	0.9	1.1	100	3.5
5 A08422-2VRsto	31.0	37.9	34.5	7.1	0	1.3	0.8	1.1	100	5.0
6 AOR07821-1	39.8	42.2	41.0	5.4	0	0.7	0.6	0.7	100	2.0
		LSD 0.05	*3.8*	*3.3*						
Average	35.0	41.7	38.3	7.8	0.2	1.1	0.7	0.9	100	
Idaho										
1 Ranger Russet	37.2	42.7	40.0	7.9	0	0.9	0.6	0.7	100	4.5
2 Russet Burbank	39.3	42.7	41.0	5.2	0	0.8	0.6	0.7	100	2.0
3 A07088-6	46.8	51.9	49.3	5.1	0	0.5	0.5	0.5	100	3.5
4 A071012-4BF	39.0	42.3	40.7	4.9	0	0.8	0.6	0.7	100	2.5
5 A08422-2VRsto	34.8	41.3	38.0	8.2	0	1.0	0.7	0.8	100	4.0
6 AOR07821-1	33.9	37.6	35.7	5.5	0	1.1	0.8	1.0	100	2.0
		LSD 0.05	*4.2*	*3.1*						
Average	38.5	43.1	40.8	6.1	0.0	0.8	0.7	0.7	100	
Oregon										
1 Ranger Russet	30.0	28.9	29.5	3.2	1	1.4	1.5	1.4	100	4.0
2 Russet Burbank	31.9	33.6	32.8	5.3	0	1.2	1.1	1.2	100	5.5
3 A07088-6	42.9	51.6	47.3	9.3	0	0.6	0.5	0.6	100	5.0
4 A071012-4BF	31.9	31.0	31.4	8.3	0	1.2	1.3	1.3	100	3.5
5 A08422-2VRsto	32.5	36.3	34.4	4.9	0	1.2	0.9	1.0	100	5.0
6 AOR07821-1	38.8	43.6	41.2	6.6	0	0.8	0.6	0.7	100	2.5
		LSD 0.05	*4.1*	*4.3*						
Average	34.7	37.5	36.1	6.2	0.2	1.1	1.0	1.0	100	

Date test performed:

Washington May 1
Idaho May 2
Oregon May 3

2017 Late Harvest Tri-State Trial
Prior to Storage

Clone	PHOTOVOLT READING stem	bud	av	rtg §	DIFF	USDA COLOR	SPECIFIC GRAVITY	rtg
Washington								
1 Ranger Russet	33.0	43.6	38.3	**4-**	11.1	0	1.087	**5**
2 Russet Burbank	21.8	45.3	33.6	**3-**	23.5	2	1.083	**5**
3 A07098-4	36.9	39.9	38.4	**4+**	6.4	0	1.082	**4**
4 A071012-4BF	25.8	45.6	35.7	**4-**	19.8	1	1.101	**1**
5 A07769-4	33.4	43.4	38.4	**4-**	10.0	0	1.079	**2**
6 A08422-2VRsto	21.5	39.3	30.4	**2-**	17.8	2	1.084	**5**
7 A08510-1LB	33.3	38.3	35.8	**4+**	6.4	0	1.086	**5**
8 A10021-5TE	38.3	47.6	42.9	**5-**	9.8	0	1.086	**5**
9 AOR07821-1	21.3	39.6	30.4	**2-**	18.4	2	1.091	**4**
10 POR12NCK50-1	32.2	50.5	41.3	**5-**	18.2	0	1.093	**3**
		LSD 0.05	*3.1*		*5.1*		*0.008*	
Average	29.8	43.3	36.5		14.1	1	1.087	
Idaho								
1 Ranger Russet	No Sample						No Sample	
2 Russet Burbank	26.0	40.6	33.3	**3-**	18.3	1	1.068	**0**
3 A07098-4	44.0	43.4	43.7	**5+**	6.4	0	1.091	**4**
4 A071012-4BF	45.6	46.2	45.9	**5+**	3.6	0	1.082	**4**
5 A07769-4	30.2	31.1	30.6	**3+**	4.8	1	1.080	**3**
6 A08422-2VRsto	24.2	28.2	26.2	**2+**	6.4	2	1.081	**4**
7 A08510-1LB	36.0	34.5	35.2	**3+**	5.8	0	1.080	**3**
8 A10021-5TE	42.5	43.4	42.9	**5+**	4.0	0	1.095	**2**
9 AOR07821-1	47.3	46.4	46.8	**5+**	4.1	0	1.094	**2**
10 POR12NCK50-1	38.6	44.8	41.7	**5+**	7.0	0	1.081	**4**
		LSD 0.05	*4.1*		*3.3*		*0.004*	
Average	37.1	39.8			6.7	0	1.083	
Oregon								
1 Ranger Russet	21.5	46.1	33.8	**3-**	24.6	2	1.068	**0**
2 Russet Burbank	24.2	42.0	33.1	**3-**	17.8	2	1.068	**0**
3 A07098-4	18.4	25.8	22.1	**1-**	10.0	3	1.066	**0**
4 A071012-4BF	17.5	41.0	29.3	**2-**	24.9	3	1.083	**5**
5 A07769-4	31.7	43.1	37.4	**4-**	15.9	0	1.072	**0**
6 A08422-2VRsto	20.2	39.6	29.9	**2-**	19.4	2	1.075	**0**
7 A08510-1LB	37.2	40.7	38.9	**4+**	5.6	0	1.084	**5**
8 A10021-5TE	30.9	40.0	35.5	**4-**	12.1	0	1.069	**0**
9 AOR07821-1	31.5	34.6	33.1	**3+**	6.6	0	1.080	**3**
10 POR12NCK50-1	36.9	44.2	40.5	**5-**	11.9	0	1.078	**2**
		LSD 0.05	*4.5*		*5.7*		*0.005*	
Average	27.0	39.7	33.4			1	1.074	

Date test performed:

Washington	Sept. 21	Sept. 19
Idaho	Sept. 27	Sept. 26
Oregon	Sept. 28	Sept. 27

§ 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.

2017 Late Harvest Tri-State Trial

Stored at 48°F after Arrival

Clone	FRENCH FRY TASTE PANEL rating	BRUISE POTENTIAL (percent) stem	bud	[color 5=darkest] stem	bud	SOFT ROT INDEX (percent) stem	bud
Washington							
1 Ranger Russet	**3.4**	100	8	4.5	1.2	12	11
2 Russet Burbank	**3.0**	96	25	3.7	1.5	14	21
3 A07098-4	**3.4**	79	46	3.3	2.0	19	24
4 A071012-4BF	**3.2**	100	63	4.2	2.4	14	16
5 A07769-4	**3.7**	71	8	2.8	1.2	20	20
6 A08422-2VRsto	**2.9**	88	33	3.3	1.8	11	13
7 A08510-1LB	**3.6**	25	0	1.6	1.0	14	15
8 A10021-5TE	**3.5**	75	13	2.8	1.3	11	13
9 AOR07821-1	**3.0**	71	21	3.0	1.5	18	18
10 POR12NCK50-1	**3.7**	75	25	3.3	1.5	10	13
LSD 0.05	*0.3*	*24*	*25*			*4*	*7*
Average	3.3	77.9	24.2	3.2	1.6	14.4	16.5
Idaho							
1 Ranger Russet	No Sample	No Sample		No Sample		No Sample	
2 Russet Burbank	**2.8**	21	0	1.5	1.0	15	15
3 A07098-4	**3.6**	42	4	2.0	1.1	10	9
4 A071012-4BF	**3.7**	83	0	3.4	1.0	10	12
5 A07769-4	**3.2**	25	0	1.6	1.0	9	10
6 A08422-2VRsto	**3.1**	42	17	1.9	1.2	10	8
7 A08510-1LB	**3.5**	0	0	1.0	1.0	8	8
8 A10021-5TE	**3.8**	54	8	2.2	1.2	11	13
9 AOR07821-1	**4.0**	88	21	3.5	1.5	10	11
10 POR12NCK50-1	**3.5**	50	17	2.3	1.4	10	12
LSD 0.05	*0.3*	*29*	*18*			*3*	*4*
Average		44.9	7.4	2.1	1.1	10.4	10.9
Oregon							
1 Ranger Russet	**3.5**	79	4	3.3	1.1	12	11
2 Russet Burbank	**3.1**	63	4	2.5	1.1	14	15
3 A07098-4	**2.7**	50	4	2.2	1.1	22	20
4 A071012-4BF	**3.0**	79	13	3.3	1.4	11	13
5 A07769-4	**3.2**	13	0	1.3	1.1	19	14
6 A08422-2VRsto	**3.4**	54	8	2.4	1.2	13	14
7 A08510-1LB	**3.6**	29	17	1.7	1.3	15	11
8 A10021-5TE	**3.5**	8	0	1.2	1.0	13	12
9 AOR07821-1	**3.4**	83	42	3.1	2.0	15	12
10 POR12NCK50-1	**3.7**	29	0	1.7	1.0	11	14
LSD 0.05	*0.3*	*26*	*17*			*4*	*4*
Average	3.3	48.8	9.2	2.3	1.2	14.5	13.6

Date test performed:

Washington	Oct. 12	Oct. 20	Nov. 7
Idaho	Oct. 13	Oct. 26	Nov. 16
Oregon	Oct. 17	Oct. 27	Nov. 21

2017 Late Harvest Tri-State Trial

Stored at 48°F for 60 Days

Clone	PHOTOVOLT READING stem	bud	average	rtg §	DIFF	USDA COLOR	% REDUCING SUGAR stem	bud	SPROUTING (%)	length (in)
Washington										
1 Ranger Russet	30.5	46.1	38.3	**4-**	15.6	0	1.3	0.5	87	0.25
2 Russet Burbank	21.4	43.6	32.5	**3-**	22.2	2	2.5	0.6	0	
3 A07098-4	28.3	32.8	30.6	**3+**	6.0	1	1.6	1.1	87	1.00
4 A071012-4BF	20.7	41.9	31.3	**3-**	21.2	2	2.6	0.7	93	0.25
5 A07769-4	27.6	42.4	35.0	**3-**	14.8	1	1.6	0.6	40	0.13
6 A08422-2VRsto	16.3	38.9	27.6	**2-**	22.6	3	3.3	0.8	13	0.25
7 A08510-1LB	27.8	37.4	32.6	**3-**	9.6	1	1.6	0.9	80	0.25
8 A10021-5TE	32.4	50.8	41.6	**5-**	18.4	0	1.2	0.5	67	0.25
9 AOR07821-1	18.4	39.0	28.7	**2-**	20.6	3	2.9	0.8	0	
10 POR12NCK50-1	34.6	50.4	42.5	**5-**	15.7	0	1.0	0.5	53	0.25
		LSD 0.05	*3.6*		*4.8*				*21*	
Average	25.8	42.3	34.1		16.7	1	2.0	0.7	52	
Idaho										
1 Ranger Russet	No Sample						No Sample		No Sample	
2 Russet Burbank	22.3	40.3	31.3	**3-**	18.1	2	2.3	0.7	0	
3 A07098-4	41.3	43.8	42.6	**5+**	7.1	0	0.7	0.6	0	
4 A071012-4BF	45.3	53.1	49.2	**5+**	8.7	0	0.6	0.6	0	
5 A07769-4	30.7	34.7	30.0	**2+**	4.8	0	1.3	1.0	73	0.50
6 A08422-2VRsto	29.2	30.5	29.8	**2+**	3.0	1	1.5	1.3	29	0.25
7 A08510-1LB	35.6	35.5	35.5	**4+**	6.2	0	1.0	1.0	7	0.25
8 A10021-5TE	48.2	53.5	50.9	**5+**	5.3	0	0.5	0.6	33	0.13
9 AOR07821-1	47.9	54.0	50.9	**5+**	6.6	0	0.5	0.5	20	0.13
10 POR12NCK50-1	42.3	56.0	49.2	**5-**	13.7	0	0.6	0.5	7	0.13
		LSD 0.05	*4.3*		*4.5*				*19*	
Average	38.1	44.6	41.0		8.2	0	1.0	0.8	19	
Oregon										
1 Ranger Russet	25.2	41.8	33.5	**3-**	17.2	1	1.9	0.7	83	1.00
2 Russet Burbank	22.0	45.2	33.6	**3-**	23.1	2	2.4	0.6	20	0.13
3 A07098-4	20.4	28.2	24.3	**1-**	15.0	2	2.6	1.6	100	0.25
4 A071012-4BF	23.1	42.5	32.5	**3-**	20.1	2	2.2	0.6	100	0.25
5 A07769-4	35.7	49.1	42.4	**5-**	18.5	0	1.0	0.5	86	0.13
6 A08422-2VRsto	18.4	40.1	29.3	**2-**	21.7	3	2.9	0.7	87	1.00
7 A08510-1LB	37.4	46.7	42.1	**5-**	10.6	0	0.9	0.5	93	0.25
8 A10021-5TE	32.1	47.9	40.0	**4-**	15.8	0	1.2	0.5	87	0.25
9 AOR07821-1	29.2	46.7	37.9	**4-**	17.5	1	1.5	0.5	92	1.00
10 POR12NCK50-1	35.8	55.8	45.8	**5-**	20.0	0	0.9	0.5	87	0.50
		LSD 0.05	*5.9*		*7.5*				*19*	
Average	27.9	44.4	36.1		17.9	1	1.7	0.7	83	

Date test performed:

Washington	Nov. 30	Nov. 30	Dec. 18
Idaho	Dec. 6	Dec. 6	Dec. 19
Oregon	Dec. 12	Dec. 12	Dec. 18

§ 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.

2017 Late Harvest Tri-State Trial

Stored at 44°F for 60 Days

Clone	PHOTOVOLT READING stem	bud	average	rtg §	DIFF	USDA COLOR	% REDUCING SUGAR stem	bud
Washington								
1 Ranger Russet	27.9	39.8	33.9	**3-**	11.8	1	1.6	0.7
2 Russet Burbank	18.0	42.6	30.3	**2-**	24.6	3	3.0	0.6
3 A07098-4	21.9	26.7	24.3	**1+**	7.2	2	2.4	1.7
4 A071012-4BF	20.2	37.0	28.6	**2-**	16.8	2	2.6	0.9
5 A07769-4	33.8	44.7	39.2	**4-**	10.9	0	1.1	0.6
6 A08422-2VRsto	13.8	31.9	22.8	**1-**	18.2	4	3.9	1.2
7 A08510-1LB	27.4	34.6	31.0	**3+**	7.2	1	1.7	1.0
8 A10021-5TE	33.2	41.9	37.5	**4-**	9.3	0	1.1	0.7
9 AOR07821-1	20.0	35.6	27.8	**2-**	16.7	2	2.7	1.0
10 POR12NCK50-1	27.2	46.4	36.8	**4-**	19.2	1	1.7	0.5
		LSD 0.05	*2.8*		*5.3*			
Average	24.3	38.1	31.2		14.2	2	2.2	0.9
Idaho								
1 Ranger Russet	No Sample						No Sample	
2 Russet Burbank	19.2	41.8	30.5	**3-**	22.6	3	2.8	0.7
3 A07098-4	38.5	50.2	44.4	**5-**	12.7	0	0.8	0.5
4 A071012-4BF	43.7	53.6	48.7	**5-**	10.9	0	0.6	0.5
5 A07769-4	36.8	38.6	38.2	**4+**	5.2	0	0.9	0.8
6 A08422-2VRsto	29.2	32.6	30.9	**3+**	3.5	1	1.5	1.2
7 A08510-1LB	35.6	40.9	38.3	**4+**	7.2	0	1.0	0.7
8 A10021-5TE	39.6	53.0	46.3	**5-**	13.4	0	0.7	0.6
9 AOR07821-1	42.4	56.4	49.4	**5-**	14.0	0	0.6	0.5
10 POR12NCK50-1	34.7	54.1	44.4	**5-**	19.4	0	1.0	0.5
		LSD 0.05	*4.2*		*5.8*			
Average	35.5	46.8	41.2		12.1	0	1.1	0.7
Oregon								
1 Ranger Russet	27.1	41.8	34.4	**3-**	14.6	1	1.7	0.7
2 Russet Burbank	20.9	41.0	31.0	**3-**	20.2	2	2.5	0.7
3 A07098-4	19.5	29.3	24.4	**1-**	10.2	2	2.8	1.5
4 A071012-4BF	22.9	44.1	32.9	**3-**	21.6	2	2.2	0.6
5 A07769-4	32.9	48.7	40.8	**5-**	16.1	0	1.1	0.5
6 A08422-2VRsto	20.2	37.0	28.6	**2-**	16.8	2	2.6	0.9
7 A08510-1LB	33.3	42.5	37.9	**4-**	10.0	0	1.1	0.6
8 A10021-5TE	28.8	42.3	35.6	**4-**	16.2	1	1.5	0.6
9 AOR07821-1	26.4	42.9	34.7	**3-**	16.5	1	1.8	0.6
10 POR12NCK50-1	27.9	49.1	38.5	**4-**	21.2	1	1.6	0.5
			4.8		6.7			
Average	26.0	41.9	33.9		16.4	1	1.9	0.7

Date test performed:

Washington	Dec. 1	Dec. 1
Idaho	Dec. 7	Dec. 7
Oregon	Dec. 13	Dec. 13

§ 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.

2017 Late Harvest Tri-State Trial

Stored at 40°F for 60 Days and Reconditioned

		PHOTOVOLT(60 Days at 40°F)						PHOTOVOLT AFTER RECONDITIONING (21 days at 60°F)				
Clone	SPROUTING (%)	stem	bud	average	rtg §	DIFF	USDA COLOR	stem	bud	average	DIFF	USDA COLOR
Washington												
1 Ranger Russet	0	12.5	24.5	18.5	**0**	12.0	4	20.9	41.6	31.2	20.7	2
2 Russet Burbank	0	9.4	23.3	16.4	**0**	13.9	4	15.9	37.6	26.8	21.7	3
3 A07098-4	0	7.9	12.6	10.3	**0**	4.7	4	12.2	17.9	15.0	6.0	4
4 A071012-4BF	0	9.1	18.5	13.8	**0**	9.3	4	21.0	41.6	31.8	20.1	2
5 A07769-4	0	19.5	46.2	32.9	**3**	27.5	2	20.9	32.4	26.7	11.4	2
6 A08422-2VRsto	0	8.3	20.6	14.5	**0**	12.3	4	13.2	33.5	23.4	20.4	4
7 A08510-1LB	0	15.0	20.3	17.6	**0**	5.4	3	24.3	36.8	30.5	12.9	2
8 A10021-5TE	0	17.5	24.0	20.7	**1**	6.9	3	20.6	33.1	26.8	12.4	2
9 AOR07821-1	0	10.7	20.4	15.5	**0**	9.6	4	18.1	32.1	25.1	14.1	3
10 POR12NCK50-1	0	14.5	28.4	21.4	**1**	14.0	3	19.6	41.1	30.3	21.5	2
LSD 0.05	*ns*			*9.2*		*17.6*				*2.7*	*5.0*	
Average	0	12.4	23.9	18.2		11.6	4	18.7	34.8	26.8	16.1	AV
Idaho												
1 Ranger Russet	No Sample	No Sample						No Sample				
2 Russet Burbank	0	14.5	18.5	16.5	**0**	5.9	3	19.3	35.0	27.2	16.2	3
3 A07098-4	0	29.0	32.9	31.0	**3**	6.6	1	33.8	43.0	38.4	11.4	0
4 A071012-4BF	0	31.5	37.3	34.4	**3**	5.9	0	37.8	47.1	42.4	10.0	0
5 A07769-4	0	22.6	20.7	21.8	**1**	4.7	2	31.4	28.9	30.6	7.0	0
6 A08422-2VRsto	No Sample	24.3	23.9	24.1	**1**	2.4	2	21.2	25.0	23.1	5.8	2
7 A08510-1LB	0	20.7	20.9	20.8	**1**	5.4	2	23.0	23.0	23.0	5.7	2
8 A10021-5TE	0	35.8	42.3	39.0	**4**	9.5	0	32.6	49.0	40.8	16.4	0
9 AOR07821-1	0	25.6	40.6	33.1	**3**	15.3	1	34.9	50.5	42.7	15.7	0
10 POR12NCK50-1	0	23.0	35.9	29.4	**2**	12.9	2	21.3	38.9	30.1	18.1	2
LSD 0.05	ns			*3.9*		*4.6*				*4.2*	*5.9*	
Average	0	25.2	30.3	27.8		7.6	1	28.4	37.8	33.1		1
Oregon												
1 Ranger Russet	0	14.6	23.4	19.0	**0**	8.9	3	18.6	36.1	27.4	17.5	3
2 Russet Burbank	0	14.8	20.3	17.6	**0**	5.9	3	16.9	29.4	23.1	13.9	3
3 A07098-4	31	11.6	16.2	13.9	**0**	5.3	4	12.6	21.1	16.9	8.5	4
4 A071012-4BF	14	17.6	30.5	24.3	**1**	13.2	3	21.0	43.7	32.0	22.6	2
5 A07769-4	20	18.6	36.6	27.6	**2**	18.0	3	19.5	42.1	30.8	22.6	2
6 A08422-2VRsto	0	14.2	23.0	18.6	**0**	8.8	4	13.7	44.2	28.9	30.6	4
7 A08510-1LB	7	26.5	36.0	31.2	**3**	10.0	1	36.1	53.0	44.5	16.8	0
8 A10021-5TE	7	18.5	23.2	20.9	**1**	5.4	3	21.8	31.2	26.5	9.7	2
9 AOR07821-1	22	18.7	27.9	23.3	**1**	9.5	3	23.1	38.0	30.6	15.6	2
10 POR12NCK50-1	20	18.4	25.7	22.0	**1**	8.5	3	25.4	49.8	37.6	24.4	1
LSD 0.05	*17*			*3.5*		*5.3*				*4.6*	*7.4*	
Average		17.4	26.3	21.8		9.3	3	20.9	38.9	29.8	18.2	2

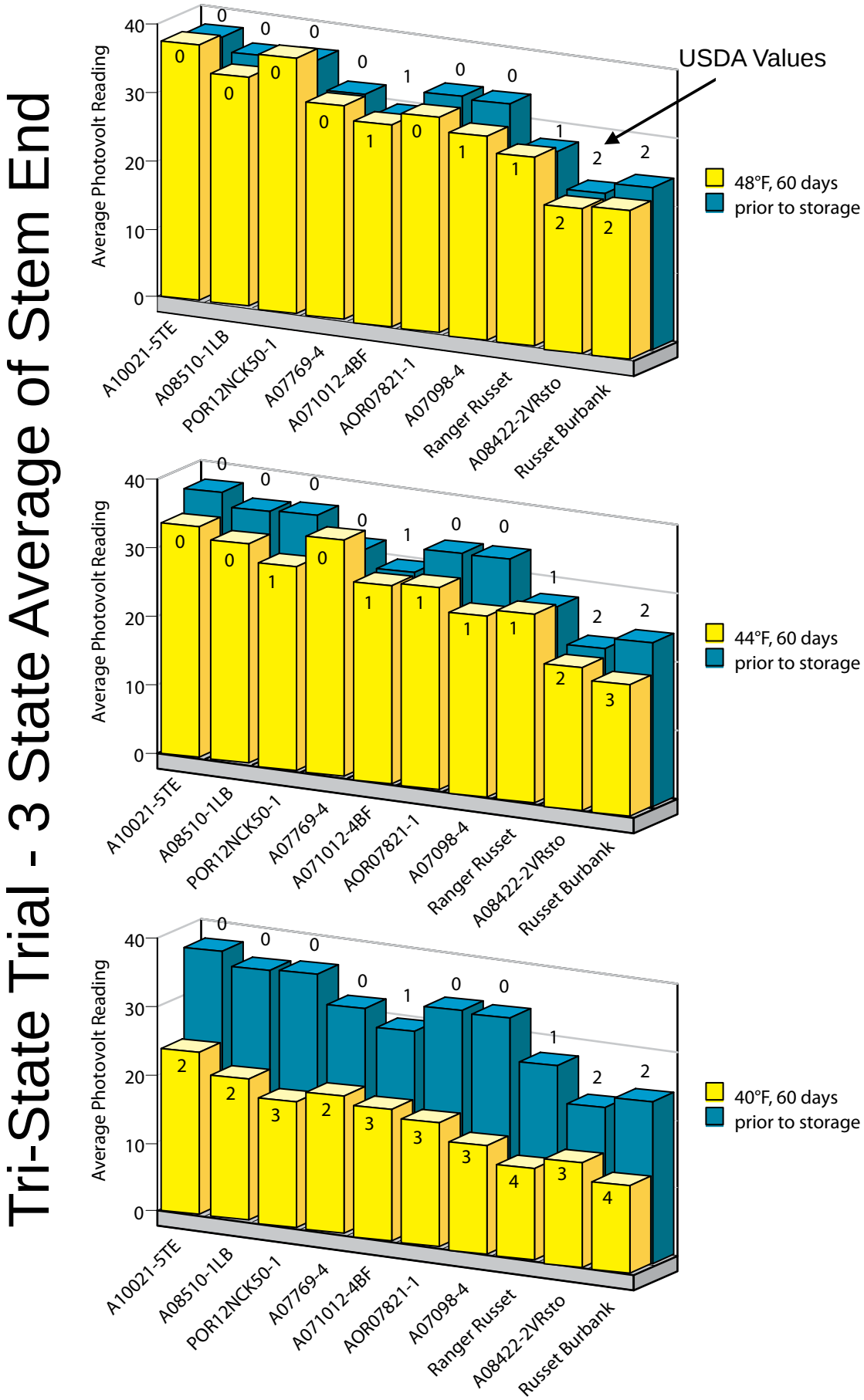
Date test performed:

Washington	Dec. 18	Dec. 2	Dec. 15
Idaho	Dec. 19	Dec. 8	Dec. 16
Oregon	Dec. 18	Dec. 14	Dec. 17

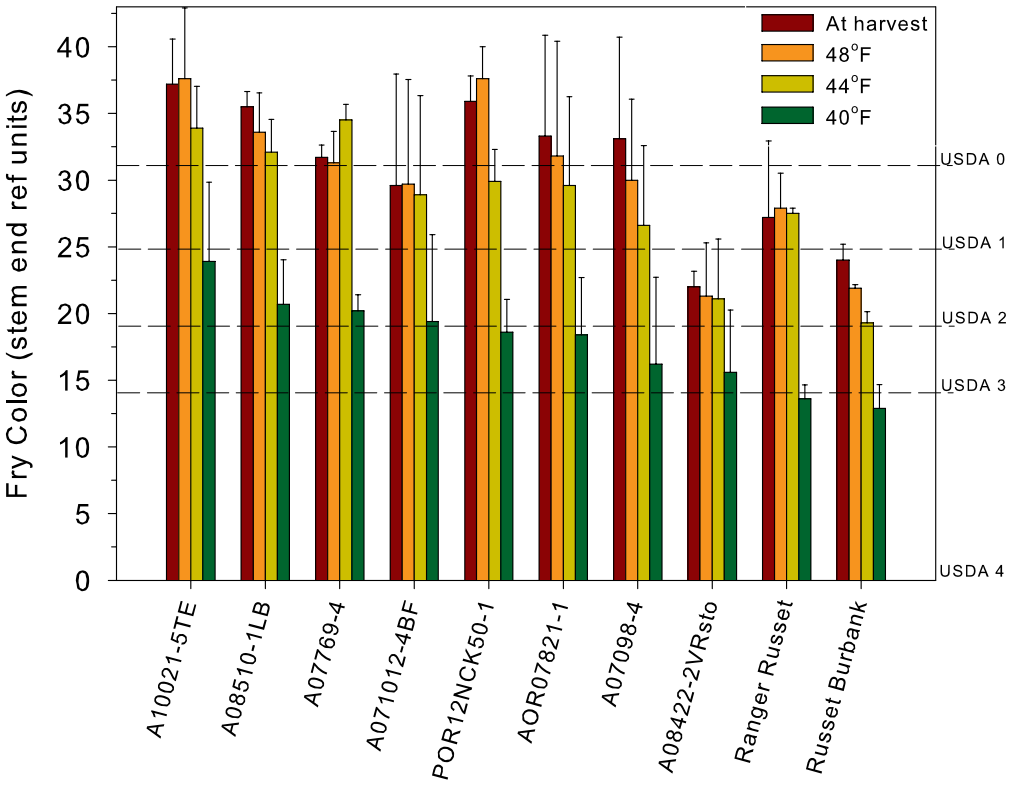
DIFF = Absolute difference between bud and stem Photovolt reading.

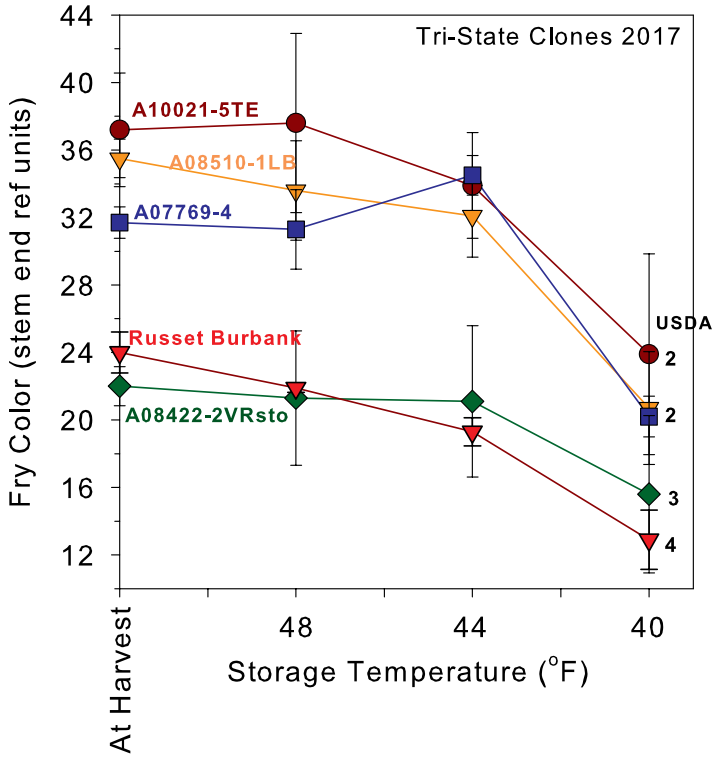
2017 Late Harvest Tri-State Trial

Tri-State Trial - 3 State Average of Stem End



2017 Late Harvest Tri-State Trial

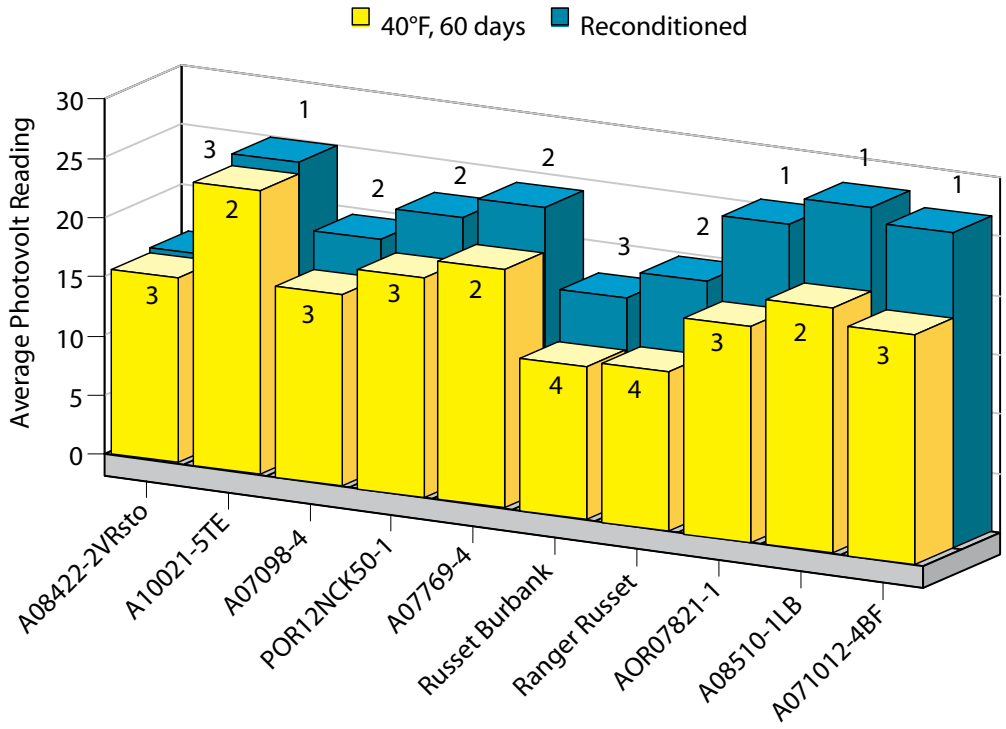


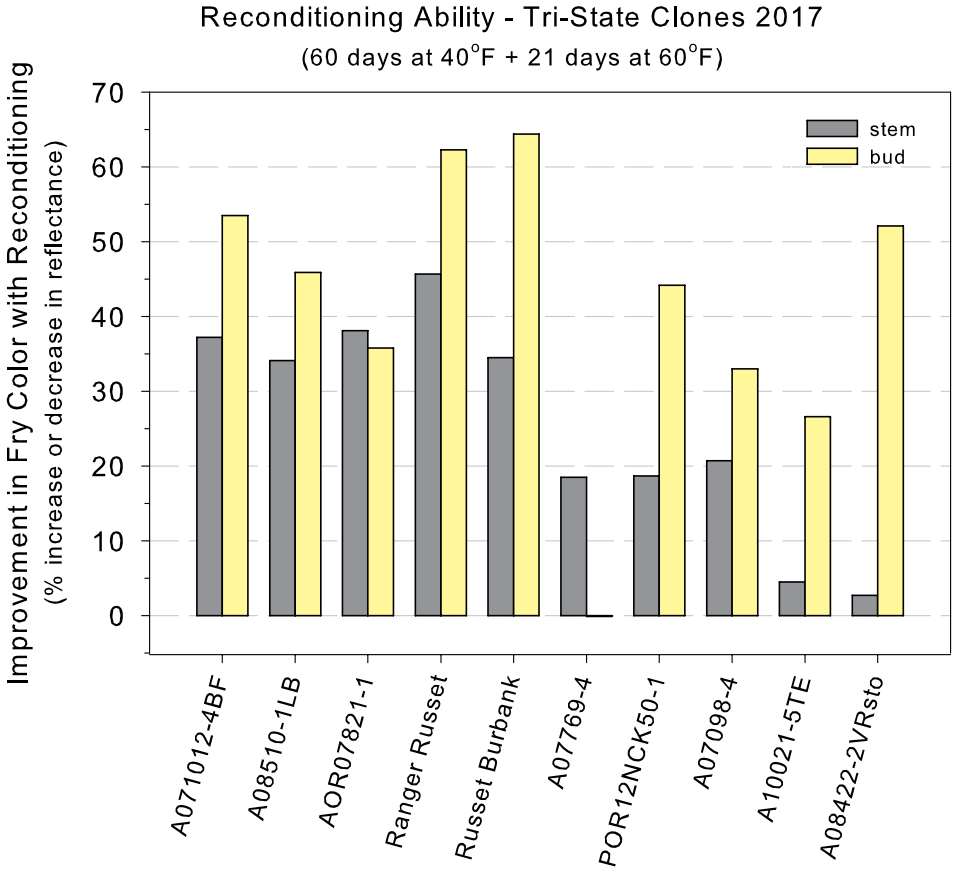


Top: At-harvest and after-storage French fry colors (stem end) of clones in the Tri-State Trial. Tubers were stored for 60 days at 48, 44, and 40°F. The clones are ranked from best to worst on fry color of the 40°F-stored tubers. High reflectance values indicate light colored fries.

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 (A10021-5TE, A08510-1LB, and A07769-4) and susceptible (A08422-2VRsto and Russet Burbank) clones in the Tri-State Trial. *Indicates similar performance of the clones last year.

2017 Late Harvest Tri-State Trial



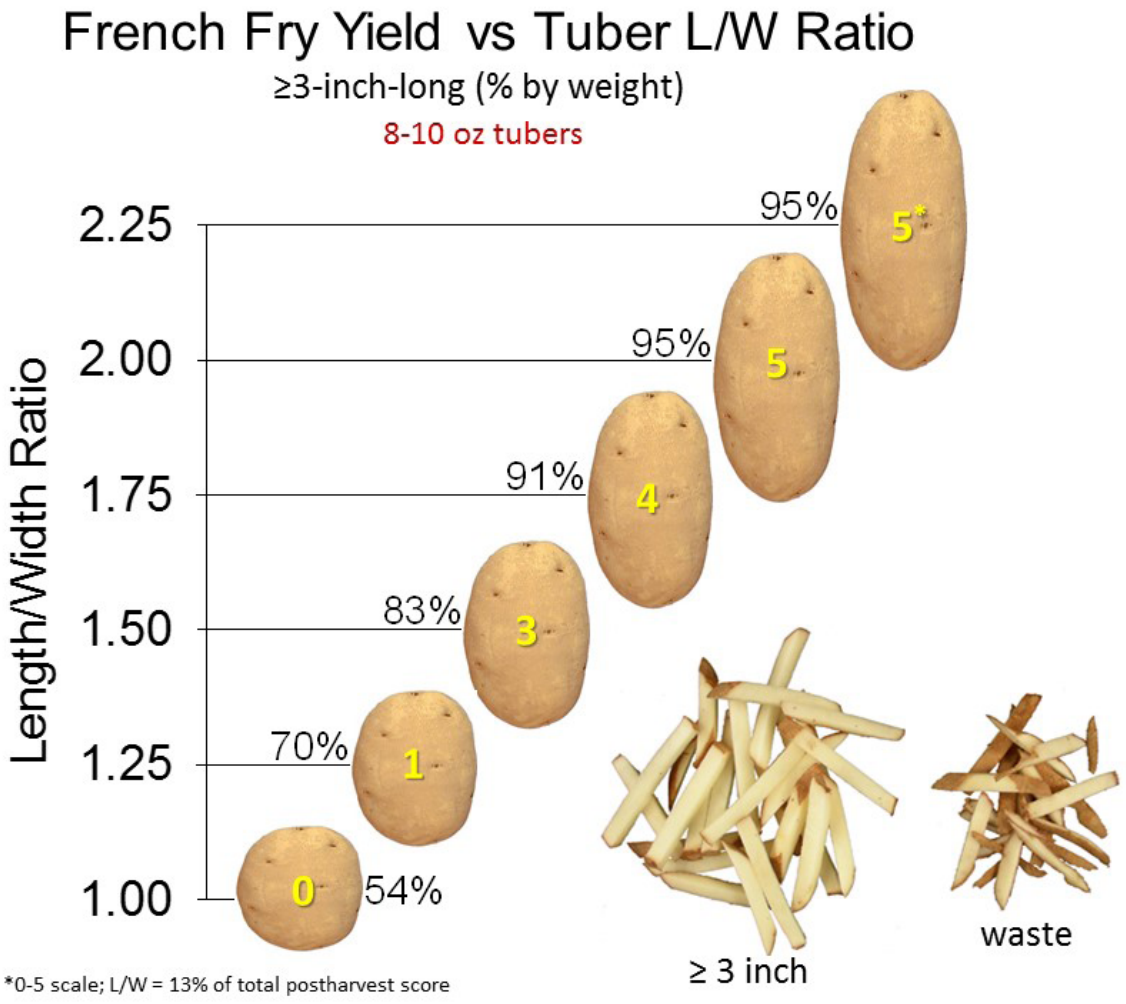


Reconditioning abilities of clones in the 2017 Tri-State Trial (3-state averages). Clones were stored at 40°F for 60 days after harvest and then reconditioned at 60°F for 21 days. **Top:** Stem end fry color before and after reconditioning. Numbers in bars indicate the USDA color rating of the stem end. **Bottom:** Percent improvement of stem and bud end fry color with reconditioning.

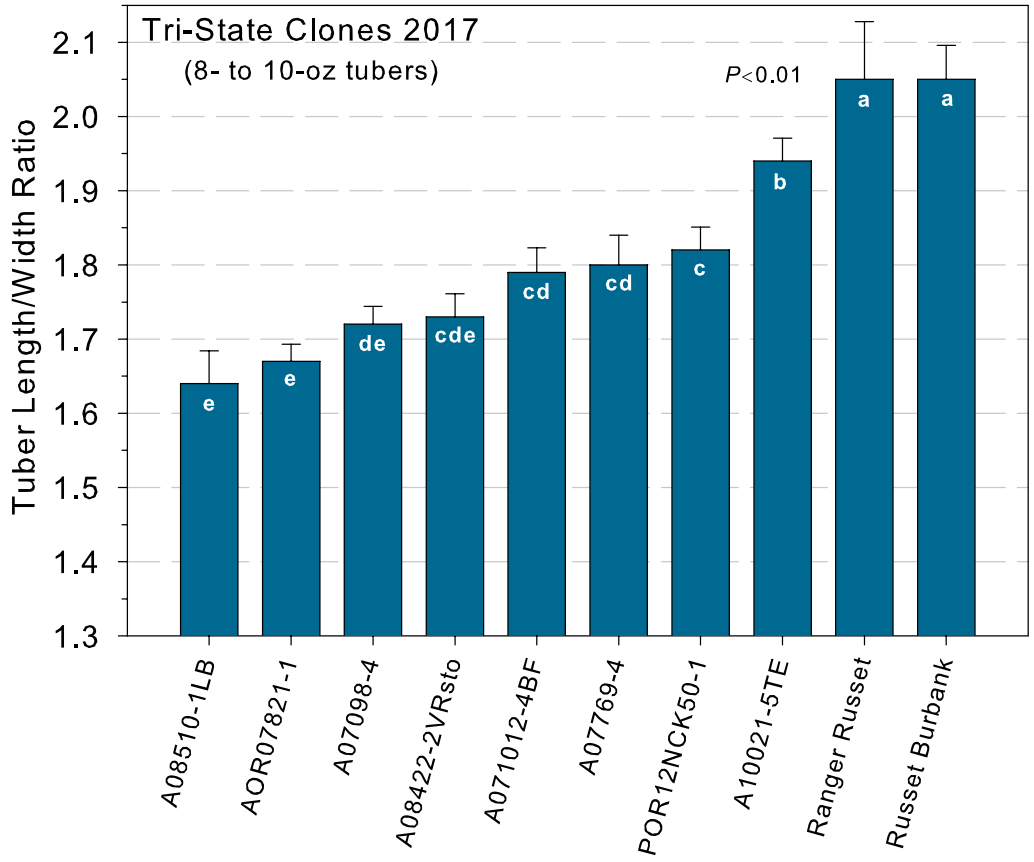
2017 Late Harvest Tri-State Trial

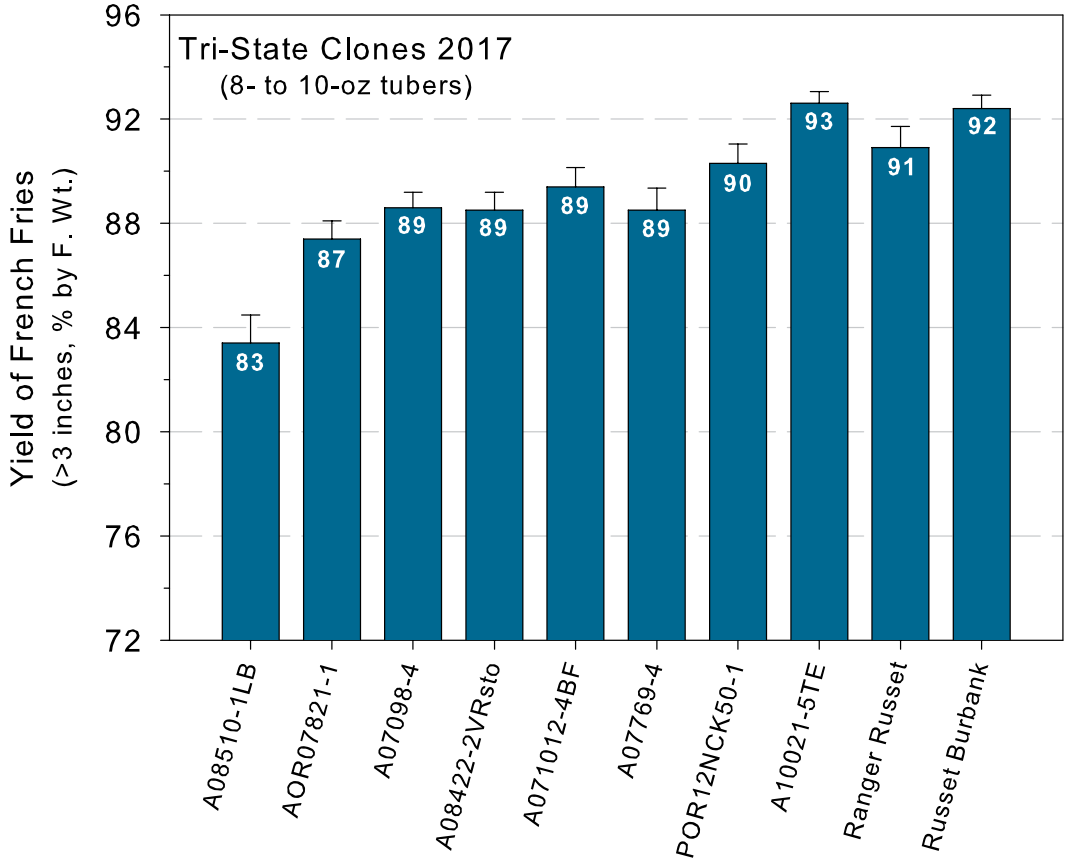
Length to Width Ratios of 8-10 oz Tubers

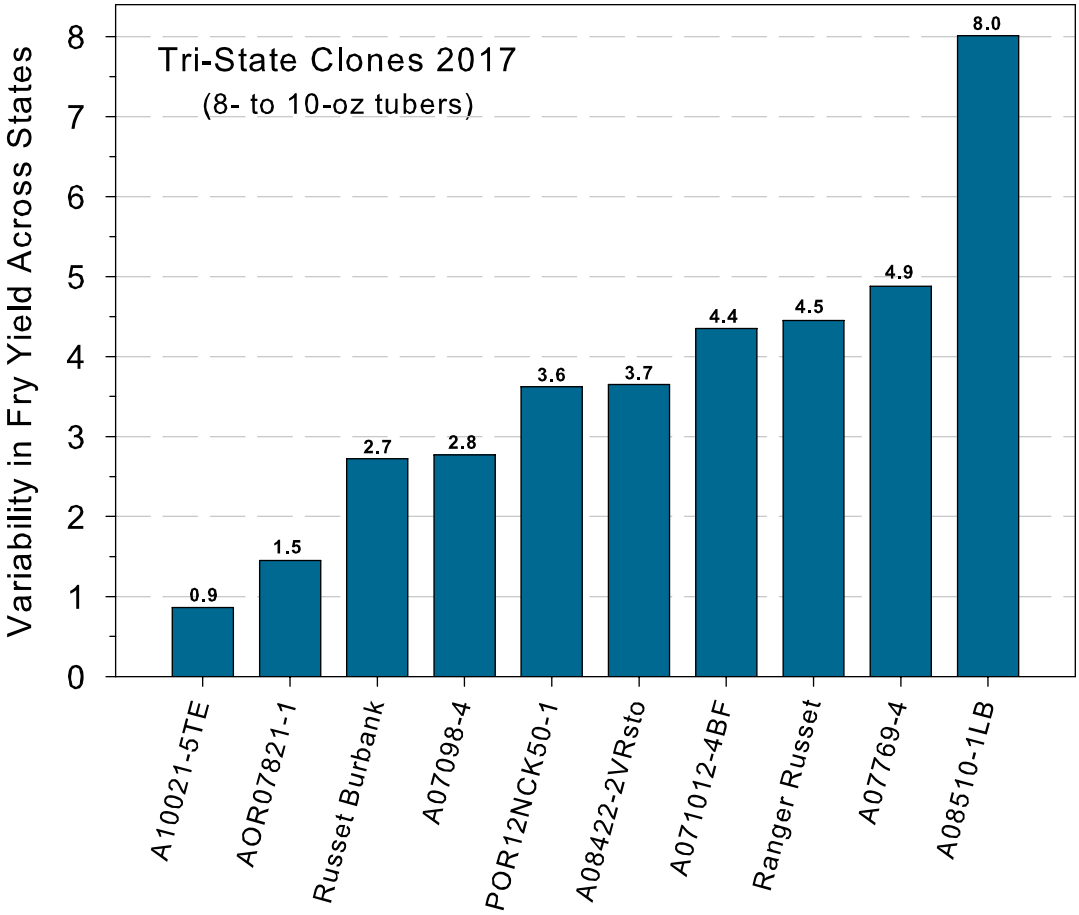
Clone	Length to width ratio WA	rtg §	ID	rtg §	OR	rtg §	3 State Avg.
1 Ranger Russet	1.64	**3**	No Sample		2.47	**5**	2.05
2 Russet Burbank	1.69	**4**	2.38	**5**	2.09	**5**	2.05
3 A07098-4	1.57	**3**	1.80	**5**	1.78	**4**	1.72
4 A071012-4BF	1.55	**3**	2.06	**5**	1.77	**4**	1.79
5 A07769-4	1.50	**3**	2.03	**5**	1.85	**5**	1.80
6 A08422-2VRsto	1.57	**3**	1.65	**4**	1.96	**5**	1.73
7 A08510-1LB	1.44	**2**	2.12	**5**	1.37	**2**	1.64
8 A10021-5TE	1.84	**5**	1.96	**5**	2.02	**5**	1.94
9 AOR07821-1	1.62	**3**	1.72	**4**	1.68	**4**	1.67
10 POR12NCK50-1	1.61	**3**	2.06	**5**	1.80	**5**	1.82
Average	1.60		1.98		1.88		1.82



2017 Late Harvest Tri-State Trial







Relative ranking of clones in the Late Season Tri-State Trial for variability in yield of French fries 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, A08510-1LB had a length to width ratio of 1.64, resulting in 83% of the tuber yielding French fries ≥3 inches in length (page 54). Tuber shape of this entry also varied the most across production sites (above), resulting in fry yields ranging from 75% to 91% (83±8%).

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

2017 Early Harvest Regional Trial

Location: WSU Research Center – Othello, WA
Planting Date: April 4 Vine Kill Date: July 20
Harvest Date: July 31 Days Grown: 107

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 2016 early harvest trial compared 4 local reference varieties to 14 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): **AO06191-1**
Process Market Standout(s): **A03141-6**

Standcounts

- **40 Day**
  Slow emergence: A06030-23 (0%) and AO06191-1 (0%).
  Best emergence: Ranger Russet (64%), A07061-6 (36%).

- **50 Day**
  Slow emergence: TX08352-5Ru (58%) and Russet Burbank (73%).
  Best emergence: Russet Norkotah (100%), AOR06070-1KF, AO03123-2 and A08009-2TE (96%).

- **60 Day**
  Poor emergence: All varieties were above (87%).

Plant and Tuber Growth & Development

- **Above Ground Stem Number Per Plant**
  Most: A07061-6 (3.7) and A08009-2TE (3.1).
  Least: AO06191-1 and Shepody (1.6).

- **Average Tuber Number Per Plant**
  Most: TX08352-5Ru (12.8) and A07061-6 (12.4).
  Least: A03141-6 (5.8) and Shepody (6.0).

- **Average Tuber Size (oz)**
  Largest: Shepody (8.3), A03141-6 (7.9) AOR07781-5 (7.2).
  Smallest: TX08352-5Ru (3.9) and A07061-6 (4.1).

- **Undersized Tubers (<4 oz)**
  Most: TX08352-5Ru and A07061-6.
  Fewest: Shepody, A03141-6, and AO06191-1.

Yield and Economic Data

- **Total Yield and U.S. #1 Yield**
  Highest: Russet Norkotah had the highest total yield (545 CWT/A) and the U.S. #1 yield (460 CWT/A). A08433-4VR had the second highest total yield (532 CWT/A) and Shepody had the second highest U.S. #1 yield (415 CWT/A).
  Lowest: AO03123-2 had the lowest total yield (411 CWT/A) and Russet Burbank had the lowest U.S. #1 yield (227 CWT/A). A06030-23 had the second lowest total yield (469 CWT/A); AO03123-2 had the second lowest U.S. #1 yield (239 CWT/A).

- **% U.S. #1's (greater than 4 oz)**
  Highest: A03141-6 (90%) and AO06191-1 (89%).
  Lowest: TX08352-5Ru and A07061-6 (52%).

- **Carton Yield (100 to 50 Count (7 to 18 oz U.S. #1 Tubers))**
  Highest: Shepody and A03141-6 (15 Tons/A).
  Lowest: TX08352-5Ru (2.4 Tons/A).

- **Gross Return ($/acre)**
  Fresh Market Highest: Shepdy and A03141-6.
  Fresh Market Lowest: TX08352-5Ru, AO03123-2, and Russet Burbank.
  Process Market Highest: AOR07781-5 and A03141-6.

Tuber Defects (30 tuber sample of 8-12 oz tubers)

- **External Defects**
  Notable Defects: Russet Burbank had 6% knobs. CO08065-2RU had 6% growth cracks. Most entries had little to no external defects.

- **Internal Defects**
  Notable Defects: A06030-23 had 23% hollow heart; CO08065-2RU had 6% hollow heart. A06030-23 had 5% brown center. Most entries had no internal defects.

- **Bruise**
  Highest Blackspot: A06030-23 (14%), Shepody (7%).
  Highest Shatter: AOR06070-1KF (48%), CO08065-2RU (28%), and AO06191-1 (23%).

2017 Early Harvest Regional Trial

Summaries

ENTRY	TOTAL YIELD CWT/A		TOTAL YIELD Tons/A	US # 1's* > 4 oz % of Total Yield	US # 2's* > 4 oz % of Total Yield	Culls* & < 4 oz % of Total Yield	CARTON YIELD 100-50 count (US 1's 7-18 oz) % of Total Yield	CARTON YIELD 100-50 count (US 1's 7-18 oz) Tons/A	PROCESS YIELD US 1's and 2's > 6 oz % of Total Yield	PROCESS YIELD US 1's and 2's > 6 oz Tons/A
Ranger Russet	453	*BCD*	22.7	79	4	17	44	10.0	58	13.3
Russet Burbank	428	*CD*	21.4	53	4	43	21	4.5	37	7.9
Russet Norkotah	545	*A*	27.2	85	1	14	48	13.0	62	16.8
Shepody	476	*ABCD*	23.8	87	4	9	63	15.0	80	19.1
A03141-6	439	*BCD*	22.0	90	2	7	68	15.0	80	17.6
A06030-23	418	*D*	20.9	81	1	18	27	5.7	41	8.6
A07061-6	485	*ABCD*	24.3	52	3	45	17	4.1	23	5.7
A08009-2TE	438	*BCD*	21.9	69	2	29	25	5.4	37	8.2
A08433-4VR	532	*A*	26.6	74	5	21	35	9.3	53	14.1
AO03123-2	411	*D*	20.5	58	1	41	14	2.8	28	5.7
AO06191-1	439	*BCD*	22.0	89	0	11	59	13.0	72	15.8
AOR06070-1KF	437	*BCD*	21.8	78	2	20	42	9.2	51	11.4
AOR07781-5	499	*ABC*	25.0	80	10	10	55	13.7	73	18.3
CO08065-2RU	497	*ABC*	24.9	71	1	29	31	7.7	44	10.9
CO08155-2RU/Y	509	*AB*	25.5	66	4	30	31	7.9	42	10.7
CO08231-1RU	477	*ABCD*	23.8	76	2	21	32	7.7	50	11.9
COTX09022-3RuRE/Y	513	*AB*	25.6	80	1	19	38	9.8	53	13.7
TX08352-5Ru	474	*ABCD*	23.7	52	0	48	10	2.4	21	5.0

ENTRY	US # 1 YIELD > 4 oz CWT/A	STATS**	US # 1 YIELD > 4 oz Tons/A	4-7 oz* %	7-14 oz* %	> 14 oz* %	> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%) (8-12 oz tubers) % HH	% BC	% IBS
Ranger Russet	360	*BC*	18.0	43	53	4	1.075	0	0	0
Russet Burbank	227	*E*	11.3	54	35	11	1.066	0	0	0
Russet Norkotah	460	*A*	23.0	43	53	4	1.076	0	0	0
Shepody	415	*AB*	20.8	22	52	25	1.077	0	0	0
A03141-6	398	*AB*	19.9	23	64	12	1.084	0	0	0
A06030-23	338	*BCD*	16.9	66	33	1	1.070	23	5	0
A07061-6	256	*DE*	12.8	68	30	3	1.070	0	0	0
A08009-2TE	304	*CDE*	15.2	64	36	0	1.067	0	0	0
A08433-4VR	394	*AB*	19.7	52	45	4	1.062	0	0	0
AO03123-2	239	*E*	12.0	77	23	0	1.069	0	0	0
AO06191-1	393	*AB*	19.7	34	62	4	1.075	0	0	0
AOR06070-1KF	345	*BC*	17.3	47	43	10	1.080	0	0	0
AOR07781-5	400	*AB*	20.0	29	63	8	1.084	0	0	0
CO08065-2RU	351	*BC*	17.5	56	40	4	1.079	6	0	0
CO08155-2RU/Y	340	*BCD*	17.0	53	45	2	1.071	0	0	0
CO08231-1RU	363	*BC*	18.2	57	40	3	1.070	0	0	0
COTX09022-3RuRE/Y	410	*AB*	20.5	51	44	5	1.079	0	0	0
TX08352-5Ru	244	*E*	12.2	80	20	0	1.061	0	0	0

* Percent values may not total 100% due to rounding

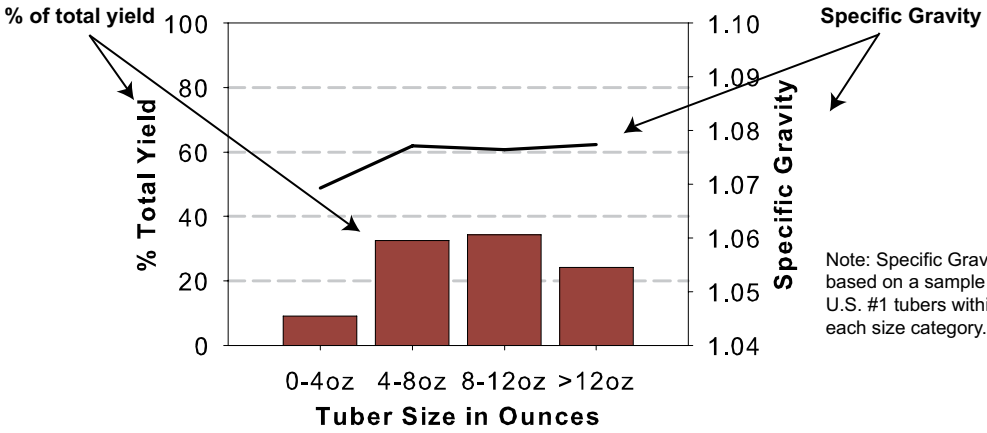
ENTRY	40 DAY STAND % Emerged	50 DAY STAND % Emerged	60 DAY STAND % Emerged	STEMS PER PLANT Above Ground	AVERAGE TUBER WEIGHT Ounces	AVERAGE TUBER NUMBER Tubers/Plant	SKIN SET 1 = Poor 5 = Good	TUBER SHAPE 1 = Round 5 = Long	BRUISE (%) (8-12 oz tubers) BLACKSPOT	BRUISE (%) (8-12 oz tubers) SHATTER
Ranger Russet	64	89	100	2.2	6.1	7.7	3	4	4	0
Russet Burbank	18	73	100	2.5	4.8	9.4	3	3	0	0
Russet Norkotah	33	100	100	2.4	6.3	9.1	4	4	0	0
Shepody	27	89	100	1.6	8.3	6.0	3	3	7	0
A03141-6	11	82	100	1.9	7.9	5.8	2	4	0	0
A06030-23	0	93	100	2.2	5.4	8.1	4	4	14	9
A07061-6	36	91	100	3.7	4.1	12.4	3	3	6	0
A08009-2TE	4	96	100	3.1	4.7	9.7	3	4	0	5
A08433-4VR	20	89	93	1.7	5.6	9.8	3	3	0	0
AO03123-2	4	96	100	2.2	4.2	10.3	3	4	5	0
AO06191-1	0	87	100	1.6	7.1	6.5	4	4	3	23
AOR06070-1KF	36	96	100	2.5	5.8	7.9	3	3	5	48
AOR07781-5	16	93	100	2.7	7.2	7.2	3	4	0	10
CO08065-2RU	13	89	100	2.5	5.6	9.3	4	4	2	28
CO08155-2RU/Y	18	93	100	2.4	5.1	10.5	4	4	0	0
CO08231-1RU	4	87	100	2.2	5.4	9.2	3	3	0	3
COTX09022-3RuRE/Y	24	87	96	2.8	5.7	9.4	4	1	0	3
TX08352-5Ru	2	58	87	2.5	3.9	12.8	3	4	0	10

Zach Holden and Alex Cruz collect petiole and soil samples in a Phosphorus study.

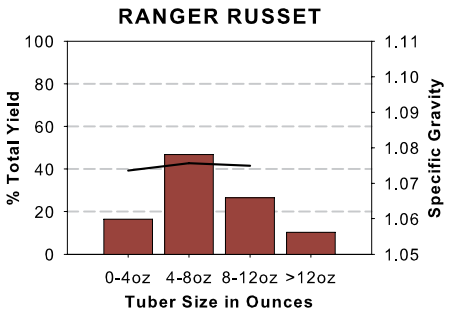
2017 Early Harvest Regional Trial

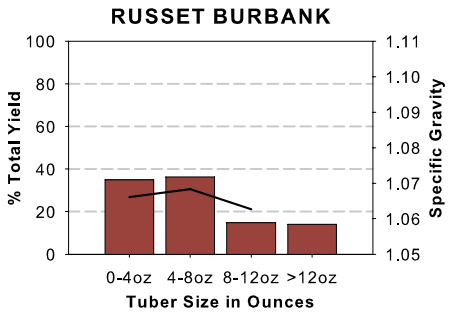
Tuber Yield and Specific Gravity Distributions

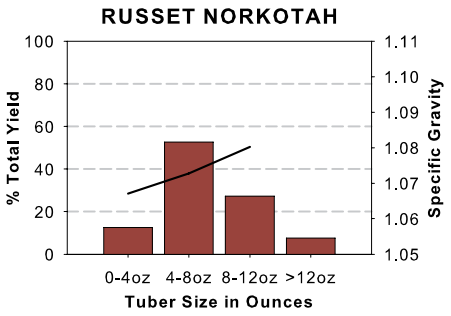
12 inch In-Row Spacing

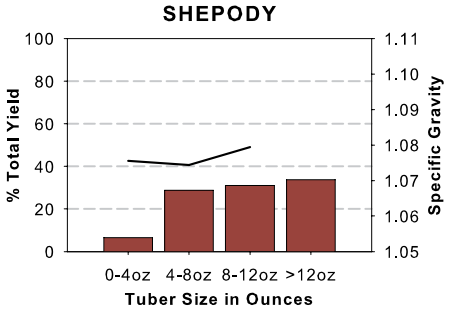


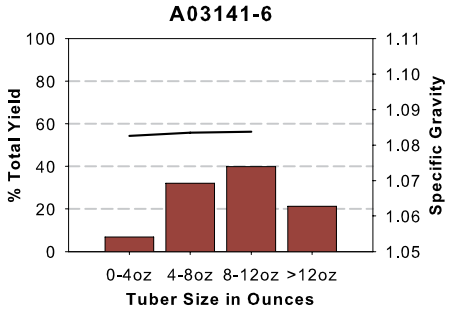
Note: Specific Gravity is based on a sample of U.S. #1 tubers within each size category.

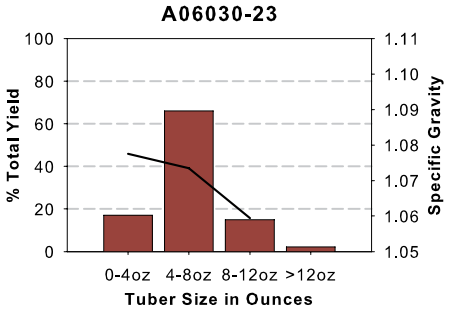


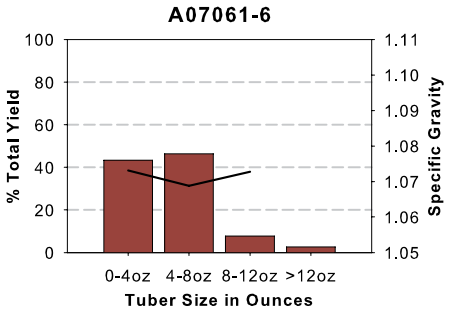


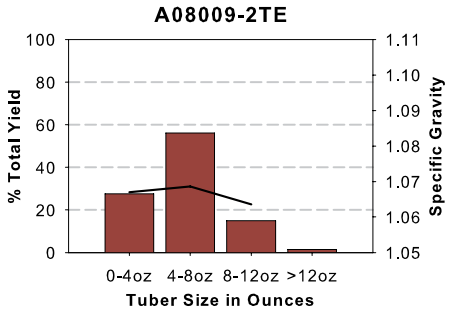


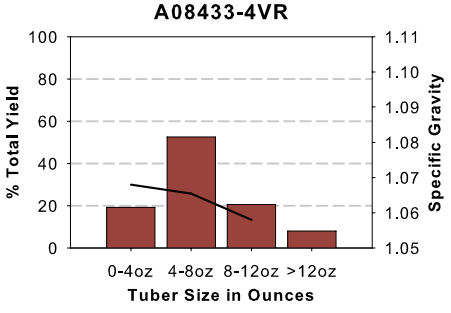


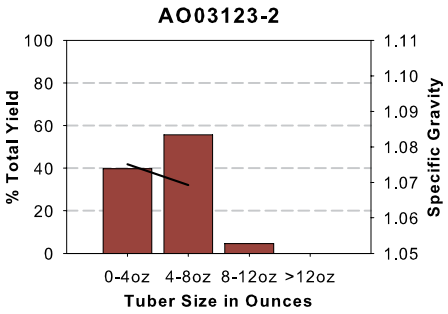


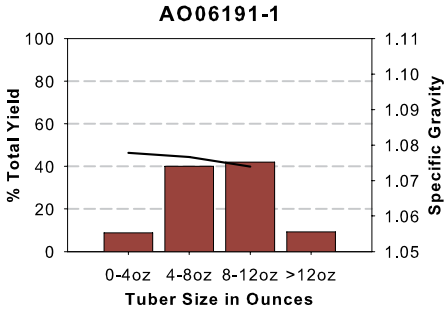


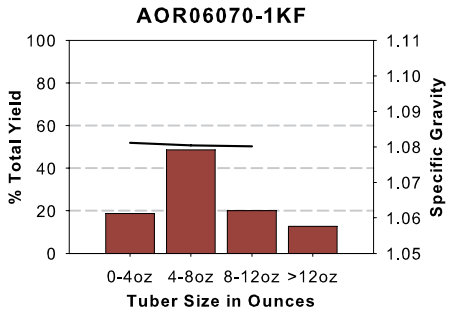


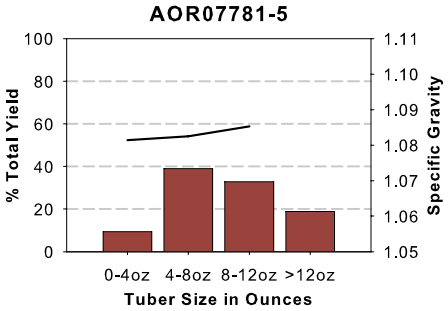


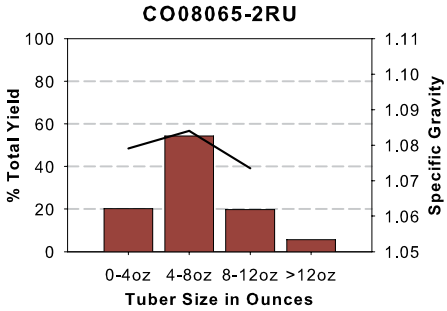


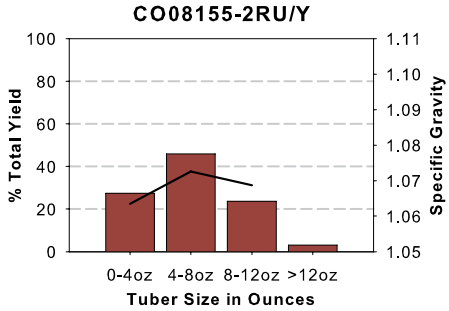

AO03123-2
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces

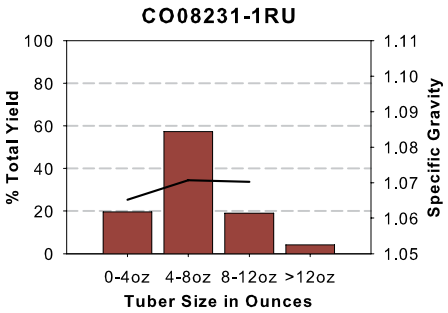

AO06191-1
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces

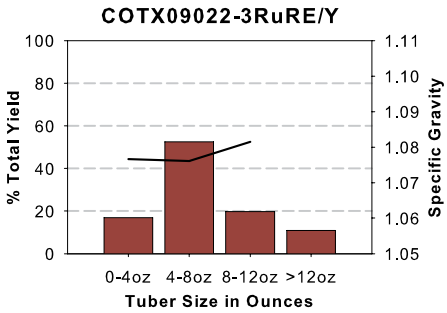

AOR06070-1KF
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces

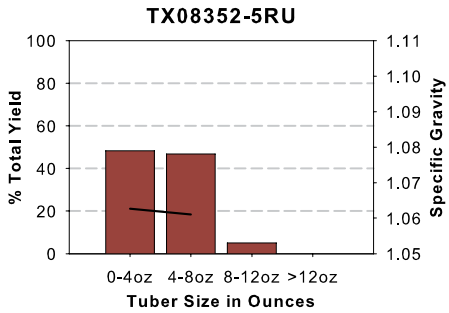

AOR07781-5
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


CO08065-2RU
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


CO08155-2RU/Y
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


CO08231-1RU
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


COTX09022-3RuRE/Y
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces


TX08352-5RU
% Total Yield
Specific Gravity
0-4oz 4-8oz 8-12oz >12oz
Tuber Size in Ounces

2017 Early Harvest Regional Trial

Tubers

Ranger Russet

A06030-23

A08009-2TE

CO08065-2RU

Russet Burbank

A07061-6

A08433-4VR

TX08352-5Ru

Russet Norkotah

AO03123-2

AOR07781-5

COTX09022-3RuRE/Y

Shepody

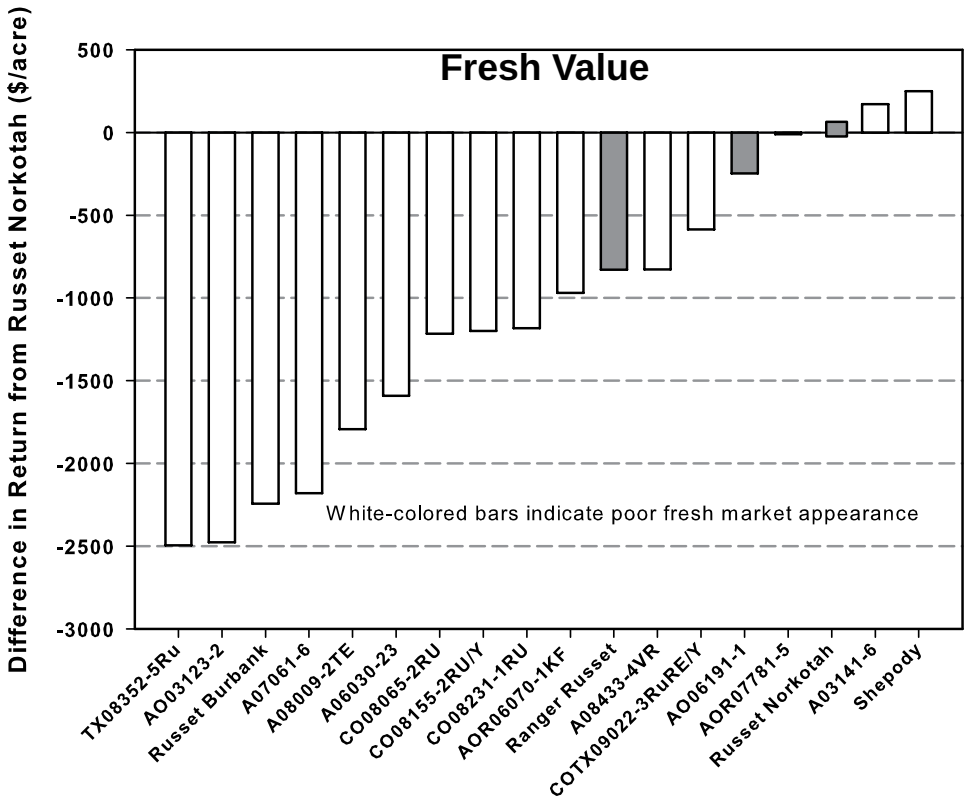
AO06191-1

A03141-6

AOR06070-1KF

CO08155-2RU/Y

CO08231-1RU



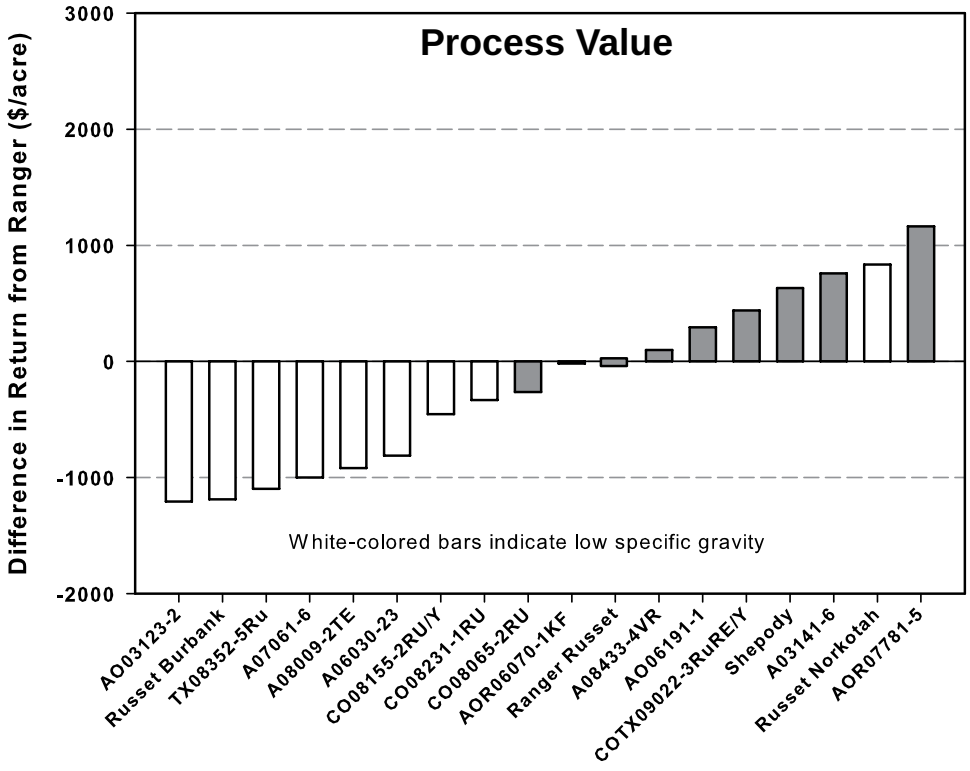


Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to the undesirable shape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

2017 Late Harvest Regional Trial

Location: WSU Research Center – Othello, WA
Planting Date: April 5 Vine Kill Date: Sept 1
Harvest Date: Sept 11 Days Grown: 149

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 3 local reference varieties and 14 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): Russet Norkotah
Process Market Standout(s): A03141-6

Standcounts

- **40Day**
  Slow emergence: TX08352-5Ru (0%).
  Best emergence: Ranger Russet (59%).

- **50 Day**
  Slow emergence: TX08352-5Ru (69%) and AO06191-1 (75%).
  Best emergence: A08009-2TE and CO08231-1RU both at (98%)

- **60 Day**
  Full emergence: CO08065-2RU, AO03123-2, A08009-2TE, and A06030-23 were all at (100%).
  Best emergence: All entries were at least 90% emerged at 60 DAP.

Plant and Tuber Growth & Development

- **Above Ground Stem Number Per Plant**
  Most: AOR07781-5 (3.4) and A07061-6 (3.1).
  Least: A08433-4VR (1.4), AO06191-1 (1.3).

- **Average Tuber Number Per Plant**
  Most: A07061-6 (11.2), TX08352-5Ru (11.2).
  Least: AO06191-1 (5.1), A03141-6 (5.1).

- **Average Tuber Size (oz)**
  Largest: A03141-6 (14.7), AO06191-1 (11.7), and A08433-4VR (9.2).
  Smallest: TX08352-5Ru (6.2), CO08155-2RU/Y (6.5).

- **Undersized Tubers (< 4 oz)**
  Most: CO08231-1RU and TX08352-5Ru.
  Least: A03141-6, AO06191-1, and AOR07781-5.

Yield and Economic Data

- **Total and U.S. #1 Yield**
  Highest: A07061-6 had the highest total yield (981 CWT/A) and had the highest U.S. # 1 yield (869 CWT/A). A03141-6 had the second highest total yield (873 CWT/A) and the second highest U.S. #1 yield (803 CWT/A).
  Lowest: A06030-23 had the lowest total yield (634 CWT/A) and lowest U.S. #1 yield (569 CWT/A).

- **% U.S. #1 Yield Greater Than 4oz.**
  Highest: COTX09022-3RuRE/Y (93%), A03141-6 and AO06191-1 (92%).
  Lowest: CO08155-2RU/Y (82%), Russet Burbank (83%).

- **Carton Yield (100 to 50 Count (7 to 18 oz US #1 Tubers))**
  Highest: A07061-6 (31.2 Tons/A), COTX09022-3RuRE/Y (30.1 Tons/A)
  Lowest: CO08155-2RU/Y (17.4 Tons/A), TX08352-5Ru (18.0 Tons/A)

- **Gross Return ($/acre)**
  Fresh Market Highest: A07061-6, COTX09022-3RuRE/Y, and A08009-2TE.
  Fresh Market Lowest: AO06191-1, CO08155-2RU/Y, and A06030-23.
  Process Market Highest: A07061-6, A03141-6, and COTX09022-3RuRE/Y.
  Process Market Lowest: CO08155-2RU/Y, A06030-23, and Russet Norkotah.

Tuber Defects (40 tuber sample of 8-12 oz tubers)

- **External Defects**
  Notable Defects: A03141-6 and AO06191-1 each had 4% green tubers, CO08065-2RU had 3% growth cracks, all other entries had little to no external defects.

- **Internal Defects**
  Notable Defects: Russet Burbank had 10% hollow heart and 13% brown center. A08009-2TE had 55% described internal brown spots which were brown necrotic spots throughout the tubers. AOR06070-1KF had 8% hollow heart. Most entries were relatively free of internal defects.

- **Bruise**
  Highest Blackspot: Ranger Russet (33%), A06030-23 and Russet Norkotah both (23%).
  Lowest Blackspot: AOR07781-5 and A08433-4VR (0%).
  Highest Shatter: AOR06070-1KF and AOR07781-5 (85%).
  Lowest Shatter: CO08155-2RU/Y (25%), Russet Norkotah (43%).

2017 Late Harvest Regional Trial

Postharvest Information

The 2017 trial evaluated ten numbered clones along with Ranger Russet and Russet Burbank 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: AOR06070-1KF*, A06030-23, AO03123-2
  Lowest scoring: RB*, RR, A03141-6, A08433-4VR

- **Low Temperature Sweetening**
  Most resistant: A06030-23*, CO08155-2RU/Y, AOR06070-1KF*, A07061-6
  Most susceptible: RB*, A08433-4VR, RR*

- **Tuber asparagine content** (WA Regional Trial samples)
  Highest concentration: RB*, A07061-6, RR*
  Lowest concentration: AOR06070-1KF*, A08433-4VR, A03141-6*, AO03123-2*

- **Taste Panel** (see WSU 2017 Potato Cultivar Evaluation book)
  Highest rated: AOR06070-1KF*, AO03123-2*
  Lowest rated: RB*, CO08155-2RU/Y

- **Blackspot Bruise Susceptibility** (see WSU 2017 Potato Cultivar Evaluation book)
  Most resistant: CO08155-2RU/Y, AOR07781-5, AO03123-2*, AOR06070-1KF
  Most susceptible: RR*, A06030-23, A03141-6, AO06191-1

- **Variability in Tuber Shape & Fry Yield (8- to 10-oz tubers)**
  Lowest L/W: A07061-6, AO06191-1
  Highest L/W: RR*, RB*, CO08155-2RU/Y, AOR06070-1KF
  Least variable: A07061-6, RB*, AOR07781-5, CO08065-2RU, CO08155-2RU/Y
  Most variable: AO06191-1*

Details

- AOR06070-1KF*, A06030-23, and AO03123-2 were the highest rated entries, accumulating an average of 27.0, 26.9, and 26.3 of 38 possible points, respectively. Overall scores of all clones were lower in 2017 compared with past years.

- A06030-23*, CO08155-2RU/Y, AOR06070-1KF*, and A07061-6 were resistant to cold sweetening, producing USDA 1-2 fries (stem end) when stored for 60 days at 40°F averaged across locations. RB*, A08433-4VR, and RR* were susceptible to LTS, producing USDA 3-4 fries after 60 days at 40°F.

- In longer term (7-month) storage studies, AOR06070-1KF* and A07061-6 had relatively short dormancy, producing sprouts averaging 4.7 and 4.0 inches in length after 7 months of storage (RB=2.9 inches). By contrast, AO06191-1* produced 0.3-inch-long sprouts after 7 months, indicating substantially longer dormancy than RB and RR.

- AOR06070-1KF*, A08433-4VR, A03141-6*, and AO03123-2* had 46, 42, 39, and 35% lower concentrations (*P*<0.05) of asparagine (acrylamide precursor) than RB, respectively. Three of these clones (indicated with an asterisk) also averaged 44% and 35% lower asparagine concentrations than RB in 2015 and 2016, respectively. A03141-6 and AOR06070-1KF (WA Regional Trial samples) also maintained the very low reducing sugar concentrations when stored at 40°F for 60 days. Low asparagine and reducing sugars are indicators of low acrylamide forming potential.

- RB*, RR, A03141-6, and A08433-4VR scored lowest on overall postharvest performance with 14.6, 16.3, 17.8, and 18.7 of 38 possible points, respectively.

- Tuber samples of CO08155-2RU/Y, RB, and A07061-6 had gravities of 1.075, 1.076, and 1.079 when averaged across states (too low for processing contracts). Average gravities of the nine remaining entries ranged from 1.081-1.093. Six of eleven entries from OR had gravities ≤1.079.

- AOR06070-1KF* and AO03123-2* were the favorites in the French fry taste panels, averaging 3.65/5 across growing locations (5 is best). RB* and CO08155-2RU/Y were the lowest scoring clones (avg=3.05/5). However, the narrow range of taste panel scores (3.0-3.7) indicates that panelists rated all entries favorably for French fry culinary quality.

- On average, tubers grown in WA produced the lightest fry colors at harvest. The Regional entries retained 95 and 90% of their at-harvest process quality (stem end fry color) when stored at 48 and 44°F for 60 days, respectively.

- Uniformity of fry color (bud to stem end fry color difference) at harvest was an issue this year with 5/12 clones from WA, 5/9 clones from ID, and 6/11 clones from OR rated unacceptable for fry color uniformity. Moreover, fry color uniformity got worse during of all entries at 48°F except A06030-23 in WA, A07061-6, AO03123-2, AOR06070-1KF, and CO08065-2RU from ID, and A06030-23 and CO08155-2RU/Y from OR. Most entries also produced non-uniform fry color when stored at 44°F for 60 days. Ranger Russet and CO08065-2RU varied the most in ability to retain process quality during storage for 60 days at 44°F across production sites.

- A08433-4VR, AO03123-2, and CO08065-2RU 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 A03141-6*, CO08155-2RU/Y, RB*, and RR had little effect on change in stem end fry color. Differences between bud and stem end fry color following reconditioning were highest in A03141-6, CO08155-2RU/Y, RB*, and RR, reflecting less improvement of stem vs bud end fry color and indicating these clones may be more susceptible to sugar ends.

- CO08155-2RU/Y, AOR07781-5, AO03123-2*, and AOR06070-1KF were resistant to blackspot, averaging 34% bruise (stem end) in the controlled impact study (3-state average). These entries also scored lowest in bruise severity, averaging 1.9/5 (1= no bruise; 5= 100% of impact area is dark). RR*, A06030-23, A03141-6, and AO06191-1 were highly susceptible with 90, 86, 83 and 81% bruise, respectively. Bruise severity was also greatest in these four entries (average 3.5/5).

- ID-grown tubers (8-10 oz.) had the highest L/W ratios (1.98) compared with those grown in OR (1.85) and WA (1.65). A07061-6, and AO06191-1 had the lowest L/W ratios (avg. 1.61), reflecting a rounder tuber shape phenotype. RR*, RB*, CO08155-2RU/Y, and AOR06070-1KF had the highest L/W ratios (1.92-2.07). AO06191-1* showed the greatest variation in L/W ratios of 8- to 10-oz tubers across production sites. By contrast, the L/W ratios of A07061-6, RB*, AOR07781-5, CO08065-2RU, and CO08155-2RU/Y were least affected by growing location.

- On average, 76% of tubers of A07061-6, CO08155-2RU/Y, and AOR07781-5 had 0.6-inch-long sprouts after 60 days of storage at 48°F compared with 92% of RR tubers (avg sprout length = 0.8 inch). Sprouting of A03141-6 and AO03123-2 averaged 40% with 0.1-inch-long sprouts, compared with 6.7% of RB tubers peeping and no sprouting of AO06191-1 (indicating long dormancy).

- When stored for 7 months, RB produced light (USDA 0) fry color from all states but fry color was non-uniform from WA. RR produced USDA 0-1 fries across production sites but the WA-grown samples were also non-uniform in color. The remaining seven entries produced USDA 0 fries that were uniform in color regardless of production site, except for AOR07781-5 that was non-uniform from OR.

Overall Regional Postharvest Merit Scores

		Postharvest Merit Scores			3 state
	Clone	WA	ID	OR	Average
9	AOR06070-1KF	2.9	4.1	3.6	3.6
4	A06030-23	4.1	3.0	3.6	3.5
7	AO03123-2	2.9	3.6	3.8	3.5
11	CO08065-2RU	3.1	2.9	3.8	3.3
8	AO06191-1	3.0	No Sample	3.3	3.2
12	CO08155-2RU/Y	2.4	3.5	2.9	2.9
5	A07061-6	2.4	4.3	2.0	2.9
10	AOR07781-5	2.8	No Sample	3.0	2.9
6	A08433-4VR	2.0	3.0	2.4	2.5
3	A03141-6	2.8	1.8	No Sample	2.3
1	Ranger Russet	2.4	No Sample	1.9	2.1
2	Russet Burbank	2.3	1.7	1.8	1.9

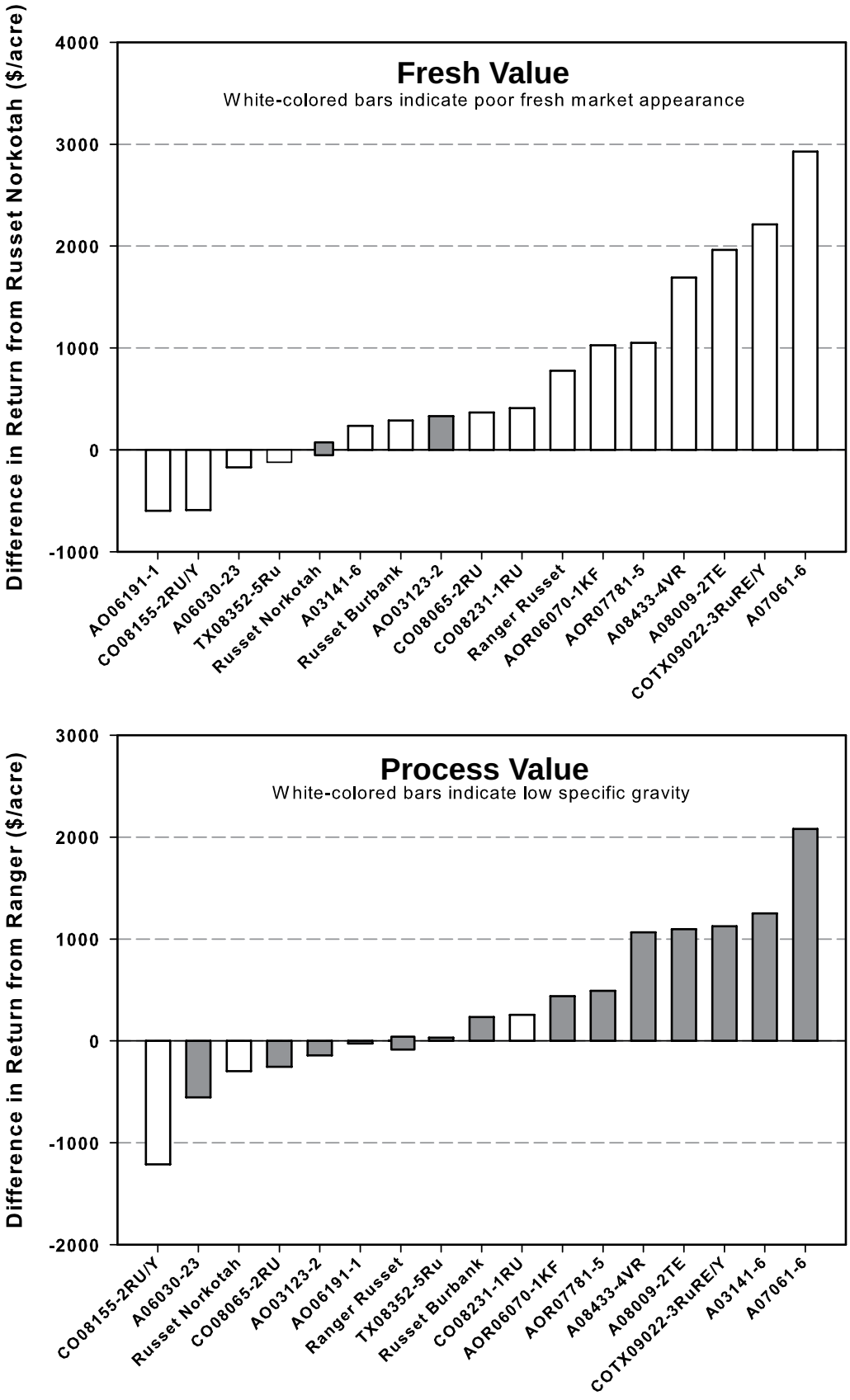


Figure 1 (Top). Difference in gross return per acre (Fresh Market) from Russet Norkotah calculated by subtracting the gross return of Russet Norkotah from the gross return of the particular entry. Entries with the white-colored bars may not appeal to fresh market consumers due to the undesirable shape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

2017 Late Harvest Regional Trial

Summaries

ENTRY	TOTAL YIELD			US # 1's* > 4 oz	US # 2's* > 4 oz	Culls* & < 4 oz	CARTON YIELD 100-50 count (US 1's 7-18 oz)		PROCESS YIELD US 1's and 2's > 6 oz	
	CWT/A	STATS**	Tons/A	% of Total Yield			% of Total Yield	Tons/A	% of Total Yield	Tons/A
Ranger Russet	754	*CDEF*	37.7	85	6	9	63	23.8	81	30.5
Russet Burbank	752	*CDEF*	37.6	83	7	10	57	21.6	77	28.8
Russet Norkotah	685	*FG*	34.2	87	4	9	60	20.7	76	26.2
A03141-6	873	*B*	43.6	92	2	6	49	21.4	93	40.3
A06030-23	634	*G*	31.7	90	1	10	63	20.1	77	24.3
A07061-6	981	*A*	49.1	88	3	8	64	31.2	78	38.2
A08009-2TE	862	*B*	43.1	87	5	8	66	28.6	82	35.2
A08433-4VR	844	*BC*	42.2	88	4	8	65	27.5	85	35.8
AO03123-2	721	*EFG*	36.1	90	1	9	62	22.3	77	27.9
AO06191-1	695	*FG*	34.7	92	1	6	55	19.1	89	31.0
AOR06070-1KF	819	*BCD*	40.9	90	1	10	59	24.3	79	32.5
AOR07781-5	794	*BCDE*	39.7	90	4	7	63	25.0	84	33.4
CO08065-2RU	738	*DEF*	36.9	87	0	13	59	21.9	74	27.4
CO08155-2RU/Y	721	*EFG*	36.1	82	4	14	48	17.4	62	22.4
CO08231-1RU	795	*BCDE*	39.7	85	1	13	55	21.7	71	28.2
COTX09022-3RuRE/Y	847	*B*	42.4	93	1	7	71	30.1	84	35.7
TX08352-5Ru	804	*BCDE*	40.2	86	0	14	45	18.0	60	24.6

ENTRY	US # 1 YIELD						> 4 oz SPECIFIC GRAVITY	INTERNAL DEFECTS (%) (8-12 oz tubers)		
	> 4 oz CWT/A	STATS**	> 4 oz Tons/A	4-7 oz*	7-14 oz*	> 14 oz*		% HH	% BC	% IBS
				%						
Ranger Russet	639	*FGHI*	32.0	22	58	20	1.089	0	0	0
Russet Burbank	624	*GHI*	31.2	25	59	16	1.088	10	13	0
Russet Norkotah	598	*HI*	29.9	28	59	13	1.076	0	0	0
A03141-6	803	*AB*	40.1	4	28	68	1.094	0	0	0
A06030-23	569	*I*	28.5	26	59	15	1.085	5	0	0
A07061-6	869	*A*	43.4	26	62	12	1.082	0	0	0
A08009-2TE	752	*BCD*	37.6	21	66	14	1.086	0	0	55
A08433-4VR	742	*BCDE*	37.1	14	55	31	1.081	0	0	0
AO03123-2	649	*EFGHI*	32.4	25	59	15	1.097	0	0	0
AO06191-1	639	*FGHI*	31.9	9	37	54	1.092	0	0	0
AOR06070-1KF	733	*BCDEF*	36.6	20	54	25	1.094	8	0	0
AOR07781-5	713	*BCDEFG*	35.6	19	54	27	1.099	0	0	0
CO08065-2RU	641	*FGHI*	32.0	23	57	20	1.096	0	0	0
CO08155-2RU/Y	588	*HI*	29.4	41	54	5	1.074	0	0	0
CO08231-1RU	678	*DEFGH*	33.9	28	52	20	1.070	0	0	0
COTX09022-3RuRE/Y	785	*ABC*	39.3	16	60	24	1.089	0	0	0
TX08352-5Ru	698	*CDEF*	34.9	48	49	3	1.066	0	0	0

* Percent values may not total 100% due to rounding

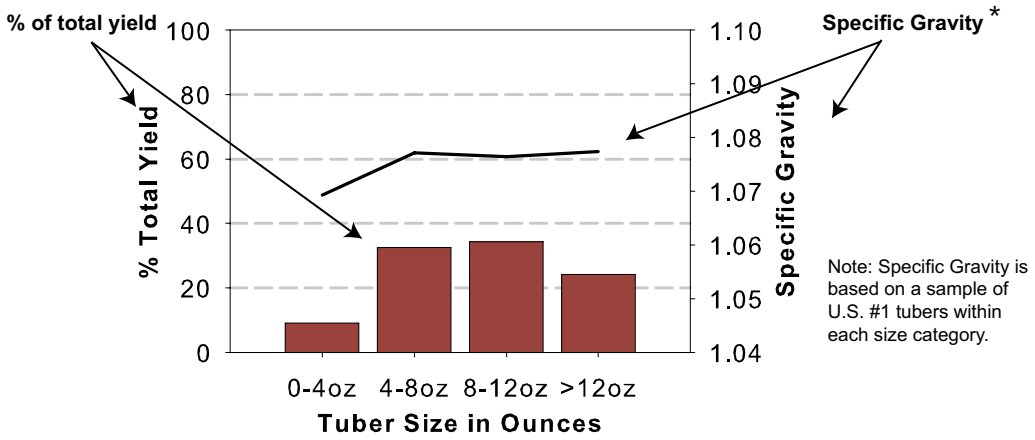
ENTRY	40 DAY STAND % Emerged	50 DAY STAND % Emerged	60 DAY STAND % Emerged	STEMS PER PLANT Above Ground	AVERAGE TUBER WEIGHT Ounces	AVERAGE TUBER NUMBER Tubers/Plant	SKIN SET 1 = Poor 5 = Good	TUBER SHAPE 1 = Round 5 = Long	BRUISE (%) (8-12 oz tubers) BLACKSPOT	BRUISE (%) (8-12 oz tubers) SHATTER
Ranger Russet	59	93	99	2.3	8.3	7.9	4	4	33	48
Russet Burbank	31	78	96	2.1	8.2	8.0	4	4	13	53
Russet Norkotah	45	95	99	2.8	7.7	7.7	4	4	23	43
A03141-6	45	94	96	1.8	14.7	5.1	2	3	5	79
A06030-23	3	86	100	2.2	7.9	7.0	4	3	23	75
A07061-6	56	94	95	3.1	7.6	11.2	3	2	8	65
A08009-2TE	29	98	100	2.6	8.1	9.2	4	3	8	55
A08433-4VR	23	86	99	1.4	9.2	8.0	4	3	0	58
AO03123-2	10	95	100	2.5	7.5	8.3	4	4	3	73
AO06191-1	1	75	94	1.3	11.7	5.1	4	3	13	80
AOR06070-1KF	51	95	96	2.4	8.8	8.1	3	3	3	85
AOR07781-5	55	94	93	3.4	9.2	7.5	4	3	0	85
CO08065-2RU	40	96	100	2.3	8.4	7.7	4	3	8	78
CO08155-2RU/Y	39	88	90	2.5	6.5	9.7	4	4	3	25
CO08231-1RU	30	98	99	2.6	7.2	9.6	4	2	5	45
COTX09022-3RuRE/Y	50	94	95	2.6	8.9	8.3	4	1	20	70
TX08352-5Ru	0	69	96	2.7	6.2	11.1	4	4	20	68

Graduate Student Alejandro Cruz applies a fertilizer treatment to a research trial in June.

2017 Late Harvest Regional Trial

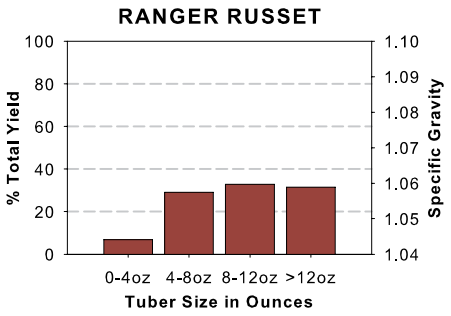
Tuber Yield and Specific Gravity Distributions

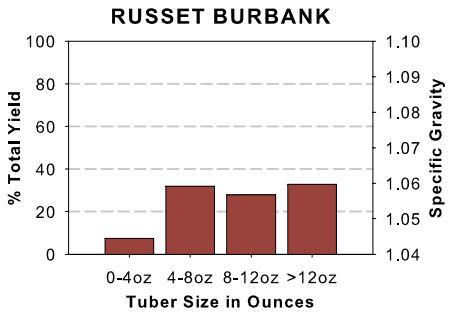
10 inch In-Row Spacing

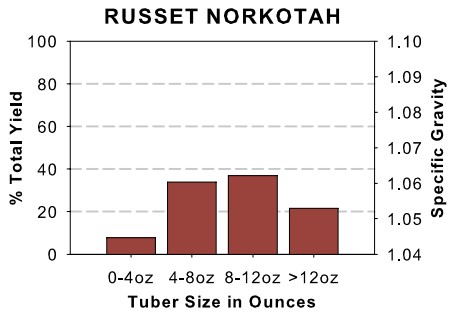


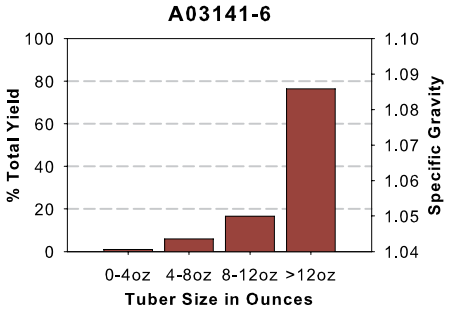
Note: Specific Gravity is based on a sample of U.S. #1 tubers within each size category.

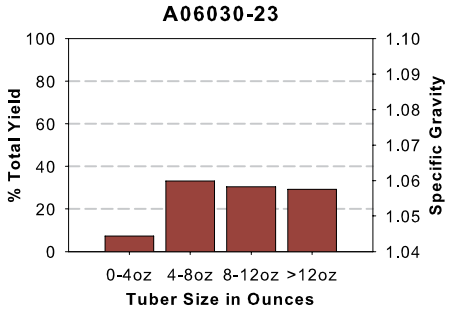
*Specific Gravities data missing from graphs as only one size was tested in 2017.

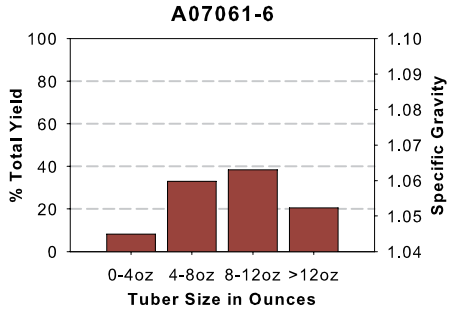


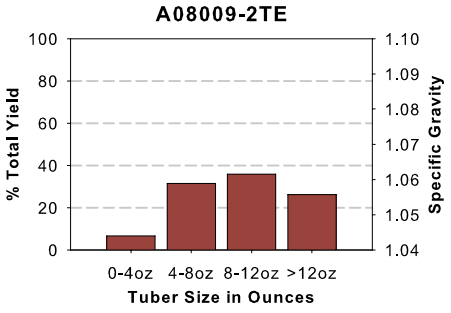


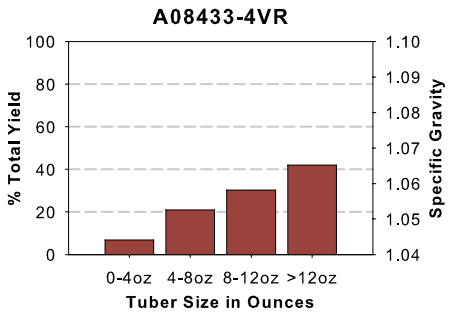


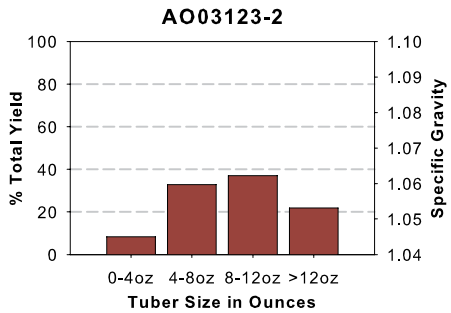




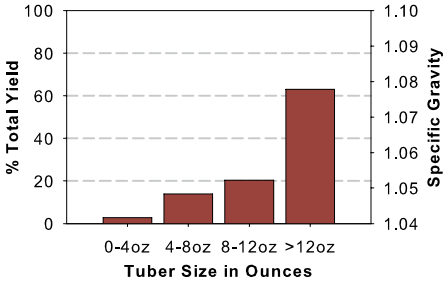




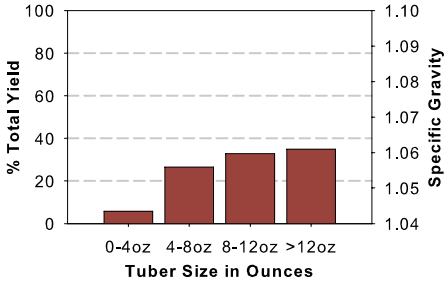




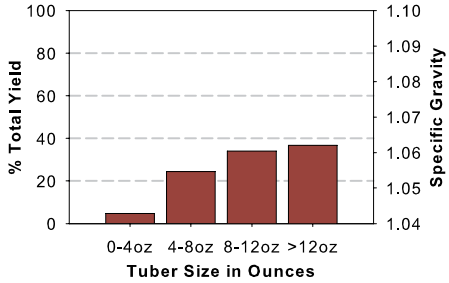
AO06191-1



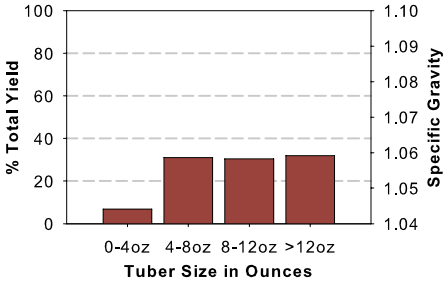
AOR06070-1KF



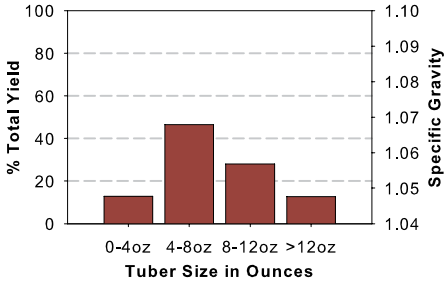
AOR07781-5



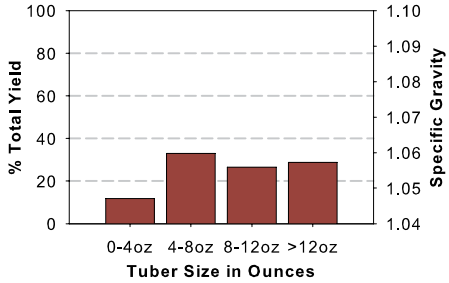
CO0865-2RU



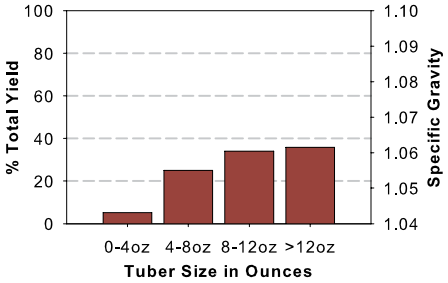
CO08155-2RU/Y



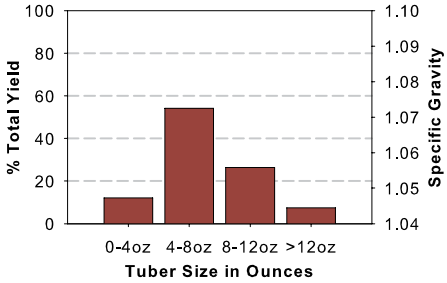
CO08231-1RU



COTX09022-3RuRE/Y



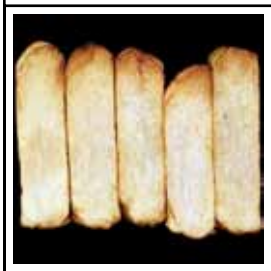
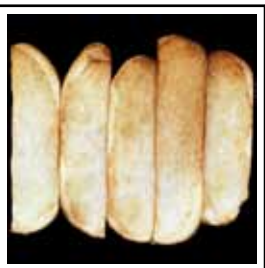
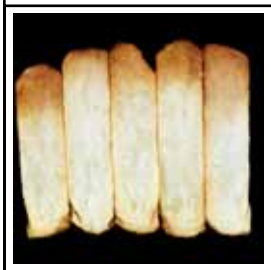
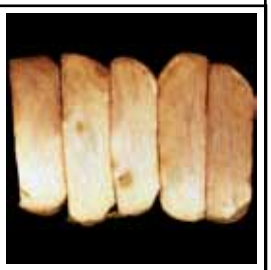
TX08352-5RU



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, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform.
Russet Burbank	
	**Tubers:** Oblong to long tubers. Good skin set; moderate eye depth. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark,non-uniform; 40°F = unnaceptably dark, non-uniform; Reconditioned = relatively dark, non-uniform.
A03141-6	
	**Tubers:** Oblong tubers. Poor skin set; moderately deep eyes. **Fry color:** At harvest= light, uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, uniform; Reconditioned = relatively dark, non-uniform.
A06030-23	
	**Tubers:** Oblong tubers. Good skin set; shallow eyes. **Fry color:** At harvest= light, uniform; 48°F = light, uniform; 44°F = light, uniform; 40°F = relatively dark, uniform; Reconditioned = light, non-uniform.
A07061-6	
	**Tubers:** Round tubers. Fair skin set; shallow eyes. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, uniform; Reconditioned = relatively dark, non-uniform.

Initial Fries	48º F Storage	44º F Storage	40º F Storage	40º F Recon.
Ranger Russet				
				
Russet Burbank				
				
A03141-6				
				
A06030-23				
				
A07061-6				
				

Tubers	WA Late Harvest Regional Trial Comments
A08433-4VR	
	Tubers: Oblong tubers. Good skin set; shallow eyes. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = relatively dark, non-uniform; 40°F = unnaceptably dark, uniform; Reconditioned = relatively dark, non-uniform.
AO03123-2	
	**Tubers:** Oblong to long 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 = relatively dark, non-uniform.
AO06191-1	
	**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 = relatively dark, non-uniform.
AOR06070-1KF	
	**Tubers:** Oblong tubers. Fair skin set; moderate eye depth. **Fry color:** At harvest= light, uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform.
AOR07781-5	
	**Tubers:** Oblong tubers. Good skin set; shallow eyes. **Fry color:** At harvest= light, non-uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform.

Initial Fries	48º F Storage	44º F Storage	40º F Storage	40º F Recon.
A08433-4VR				
				
AO03123-2				
				
AO06191-1				
				
AOR06070-1KF				
				
AOR07781-5				
				

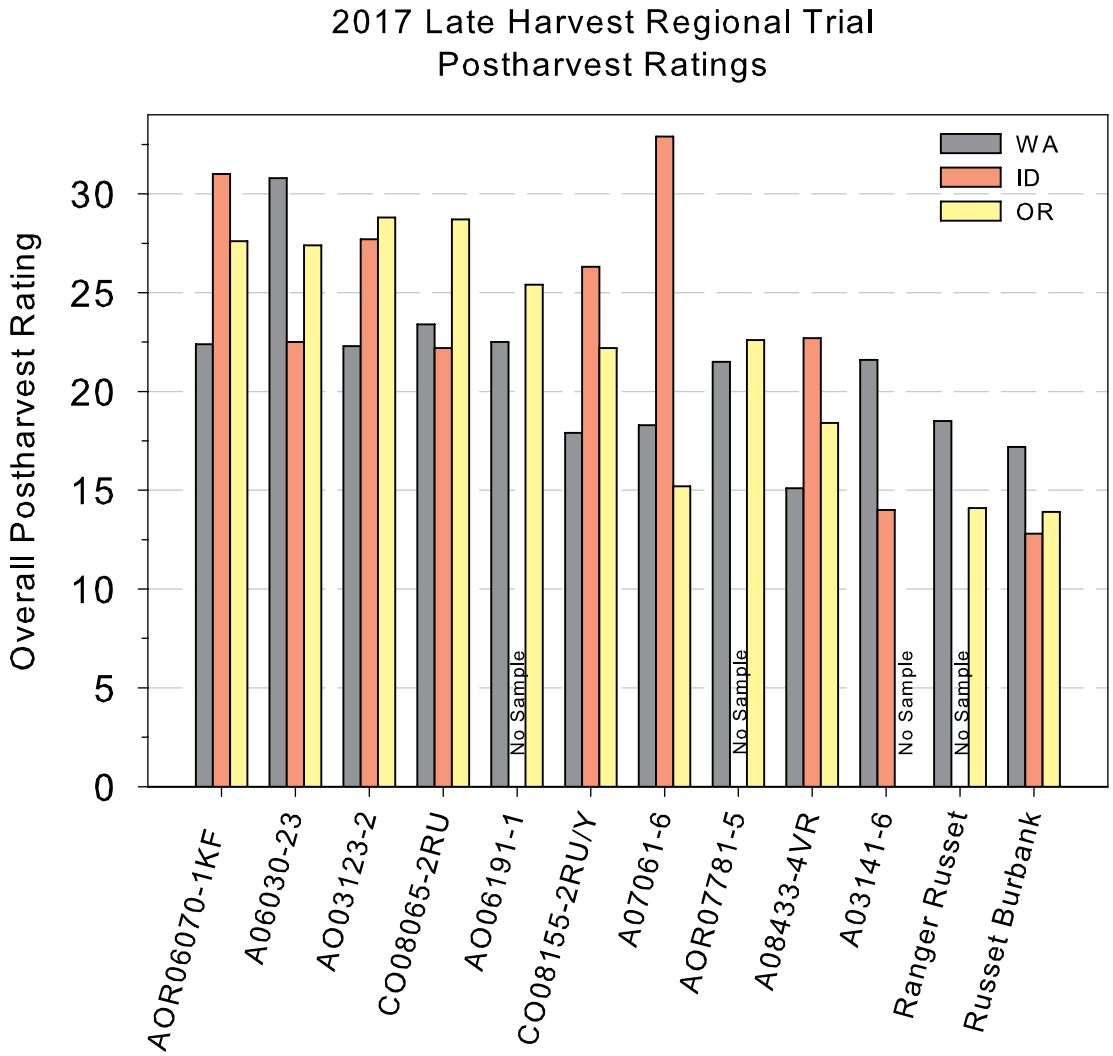
Tubers	WA Late Harvest Regional Trial Comments
CO08065-2RU	
	**Tubers:** Oblong tubers. Good skin set; moderate eye depth. **Fry color:** At harvest= light, uniform; 48°F = light, non-uniform; 44°F = light, non-uniform; 40°F = relatively dark, non-uniform; Reconditioned = light, non-uniform.
CO08155-2RU/Y	
	**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, uniform; Reconditioned = relatively dark, non-uniform.

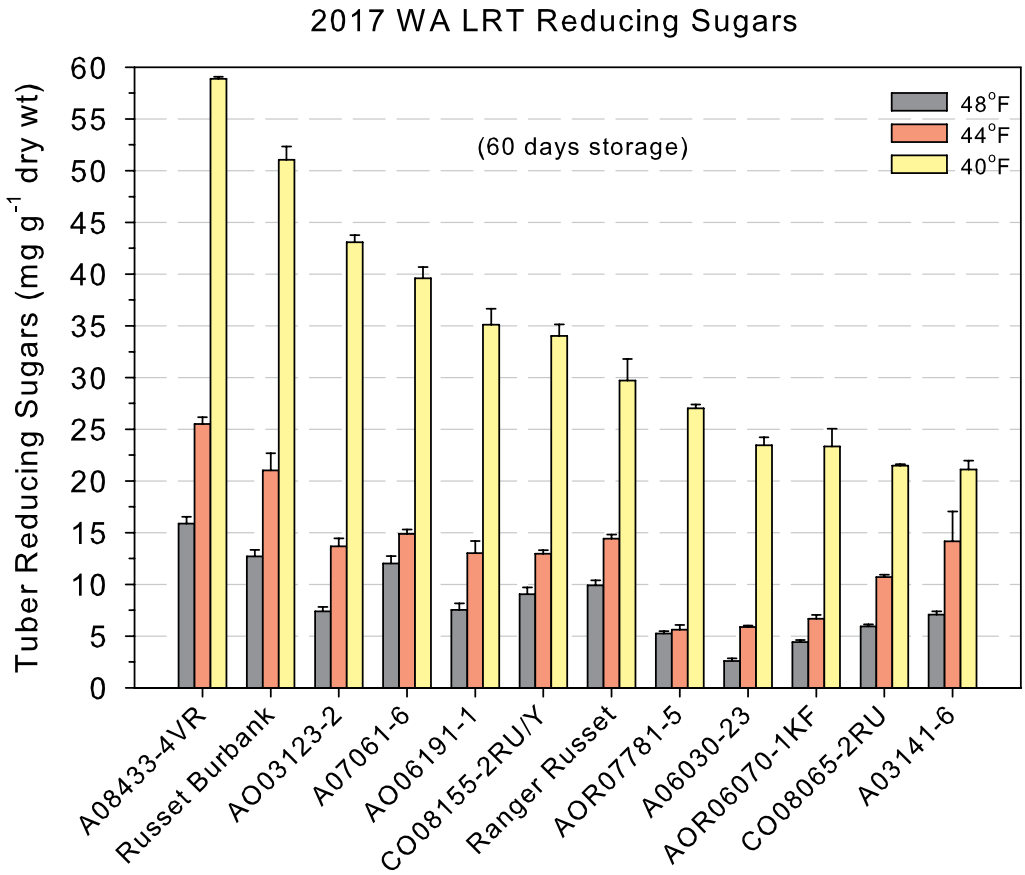
Initial Fries	48º F Storage	44º F Storage	40º F Storage	40º F Recon.
CO08065-2RU				
				
CO08155-2RU/Y				
				

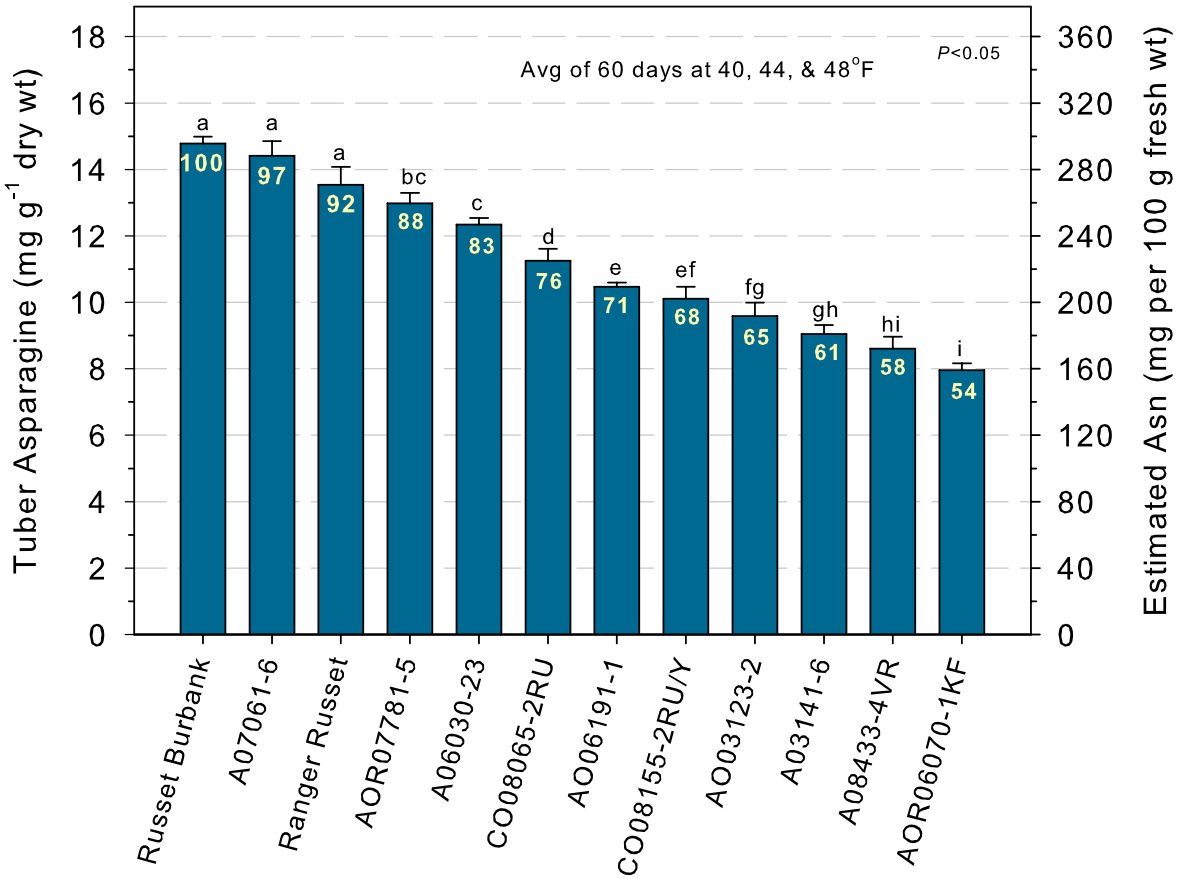
2017 Late Harvest Regional Trial

Accumulated Total Postharvest Ratings of Clones

Clone	WA Rating Total §	WA Discard §§	ID Rating Total §	ID Discard §§	OR Rating Total §	OR Discard §§	3 State av. Rating Total
9 AOR06070-1KF	22.4		31.0		27.6		27.0
4 A06030-23	30.8		22.5		27.4	Sp. Gr.	26.9
7 AO03123-2	22.3		27.7		28.8		26.3
11 CO08065-2RU	23.4		22.2		28.7		24.8
8 AO06191-1	22.5		No Sample		25.4		24.0
12 CO08155-2RU/Y	17.9	Sp. Gr.	26.3	40°F	22.2	Sp. Gr.	22.1
5 A07061-6	18.3		32.9		15.2	Sp. Gr.	22.1
10 AOR07781-5	21.5		No Sample		22.6		22.1
6 A08433-4VR	15.1	40°F	22.7		18.4		18.7
3 A03141-6	21.6		14.0		No Sample		17.8
1 Ranger Russet	18.5		No Sample		14.1	Sp. Gr., 40°F	16.3
2 Russet Burbank	17.2	40°F	12.8	Sp. Gr., 40°F	13.9	Sp. Gr., 40°F	14.6
	21.0		23.6		22.2		21.9




2017 WA LRT Reducing Sugars
(60 days storage)
48°F
44°F
40°F
Tuber Reducing Sugars (mg g-1 dry wt)
0
5
10
15
20
25
30
35
40
45
50
55
60
A08433-4VR
Russet Burbank
AO03123-2
A07061-6
AO06191-1
CO08155-2RU/Y
Ranger Russet
AOR07781-5
A06030-23
AOR06070-1KF
CO08065-2RU
A03141-6


Avg of 60 days at 40, 44, & 48°F
P<0.05
Tuber Asparagine (mg g-1 dry wt)
Estimated Asn (mg per 100 g fresh wt)
0
2
4
6
8
10
12
14
16
18
0
40
80
120
160
200
240
280
320
360
a
100
a
97
a
92
bc
88
c
83
d
76
e
71
ef
68
fg
65
gh
61
hi
58
i
54
Russet Burbank
A07061-6
Ranger Russet
AOR07781-5
A06030-23
CO08065-2RU
AO06191-1
CO08155-2RU/Y
AO03123-2
A03141-6
A08433-4VR
AOR06070-1KF

2017 Late Harvest Regional Trial

Prior to Storage

Clone	PHOTOVOLT READING stem	bud	av	rtg §	DIFF	USDA COLOR	SPECIFIC GRAVITY	rtg
Washington								
1 Ranger Russet	35.9	42.0	38.9	**4+**	6.1	0	1.104	**1**
2 Russet Burbank	27.1	42.9	35.0	**3-**	15.9	1	1.088	**5**
3 A03141-6	48.3	47.3	47.8	**5+**	3.8	0	1.094	**2**
4 A06030-23	46.7	43.8	45.2	**5+**	4.1	0	1.085	**5**
5 A07061-6	26.0	40.7	33.4	**3-**	14.7	1	1.082	**4**
6 A08433-4VR	25.3	36.6	30.9	**3-**	11.4	1	1.081	**4**
7 AO03123-2	47.3	44.6	45.9	**5+**	4.3	0	1.097	**1**
8 AO06191-1	37.0	45.0	41.0	**5+**	8.5	0	1.092	**3**
9 AOR06070-1KF	45.0	46.6	45.8	**5+**	2.5	0	1.101	**1**
10 AOR07781-5	36.3	48.5	42.4	**5-**	12.8	0	1.099	**1**
11 CO08065-2RU	48.0	51.4	49.7	**5+**	3.5	0	1.096	**1**
12 CO08155-2RU/Y	32.6	44.2	38.4	**4-**	13.9	0	1.074	**0**
		LSD 0.05	*2.5*		*3.9*		*0.011*	
Average	38.0	44.5	41.2		8.5	0	1.091	
Idaho								
1 Ranger Russet	No Sample						No Sample	
2 Russet Burbank	21.2	47.6	34.4	**3-**	26.4	2	1.072	**0**
3 A03141-6	27.1	37.3	32.2	**3-**	10.8	1	1.076	**1**
4 A06030-23	30.4	49.2	39.8	**4-**	18.8	1	1.095	**2**
5 A07061-6	43.0	50.8	43.0	**5+**	7.2	0	1.086	**5**
6 A08433-4VR	31.6	41.8	36.7	**4-**	11.5	0	1.086	**5**
7 AO03123-2	35.5	41.7	35.4	**3+**	5.7	0	1.090	**4**
8 AO06191-1	No Sample						No Sample	
9 AOR06070-1KF	41.6	48.7	45.2	**5+**	7.1	0	1.091	**4**
10 AOR07781-5	No Sample						No Sample	
11 CO08065-2RU	25.3	35.9	30.6	**3-**	10.6	1	1.088	**5**
12 CO08155-2RU/Y	35.7	40.7	38.2	**4+**	6.8	0	1.086	**5**
		LSD 0.05	*4.0*		*4.7*		*0.005*	
Average	32.4	43.7	37.3		11.6	1		
Oregon								
1 Ranger Russet	21.5	46.1	33.8	**3-**	24.6	2	1.068	**0**
2 Russet Burbank	24.2	42.0	33.1	**3-**	17.8	2	1.068	**0**
3 A03141-6	No Sample						No Sample	
4 A06030-23	39.5	42.3	40.9	**5+**	6.0	0	1.070	**0**
5 A07061-6	27.7	41.2	34.4	**3-**	13.5	1	1.068	**0**
6 A08433-4VR	29.8	39.0	34.4	**3-**	9.4	1	1.078	**2**
7 AO03123-2	42.4	46.5	44.5	**5+**	6.9	0	1.083	**5**
8 AO06191-1	35.8	45.8	40.8	**5-**	10.9	0	1.082	**4**
9 AOR06070-1KF	37.9	44.9	41.4	**5+**	7.9	0	1.086	**5**
10 AOR07781-5	38.3	47.1	42.7	**5-**	9.8	0	1.079	**2**
11 CO08065-2RU	41.3	45.0	43.1	**5+**	6.4	0	1.085	**5**
12 CO08155-2RU/Y	32.5	39.1	35.8	**4+**	7.4	0	1.065	**0**
		LSD 0.05	*4.1*		*5.4*		*0.006*	
Average	33.7	43.5	38.6		11.0	1	1.076	

Date test performed:

Washington	Sept. 20	Sept. 18
Idaho	Sept. 26	Sept. 25
Oregon	Sept. 28	Sept. 27

§ 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.

2017 Late Harvest Regional Trial

Stored at 48°F after Arrival

Clone	FRENCH FRY TASTE PANEL rating	BRUISE POTENTIAL (percent) stem	bud	[color 5=darkest] stem	bud	SOFT ROT INDEX (percent) stem	bud
Washington							
1 Ranger Russet	**3.5**	100	29	4.4	1.6	12	15
2 Russet Burbank	**3.2**	92	17	3.6	1.4	15	20
3 A03141-6	**3.6**	75	8	3.0	1.2	12	15
4 A06030-23	**3.8**	100	33	4.4	1.9	12	13
5 A07061-6	**3.3**	79	13	2.9	1.3	15	16
6 A08433-4VR	**3.1**	50	0	2.5	1.0	12	14
7 AO03123-2	**3.3**	50	13	2.3	1.3	12	11
8 AO06191-1	**3.5**	96	75	3.8	2.8	10	11
9 AOR06070-1KF	**3.4**	92	17	3.9	1.4	12	12
10 AOR07781-5	**3.5**	58	21	2.4	1.5	16	25
11 CO08065-2RU	**3.4**	100	75	4.0	2.7	13	11
12 CO08155-2RU/Y	**2.9**	21	0	1.5	1.0	14	22
LSD 0.05	*0.3*	*24*	*22*			*5*	*7*
Average	3.4	76.0	25.0	3.2	1.6	13.0	15.5
Idaho							
1 Ranger Russet	**No Sample**	No Sample		No Sample		No Sample	
2 Russet Burbank	**2.8**	25	4	1.7	1.1	15	13
3 A03141-6	**3.0**	92	0	3.5	1.0	17	19
4 A06030-23	**3.5**	92	4	3.8	1.1	13	11
5 A07061-6	**3.9**	42	8	1.9	1.2	17	16
6 A08433-4VR	**3.7**	83	21	3.0	1.4	15	18
7 AO03123-2	**3.7**	46	8	2.0	1.2	15	15
8 AO06191-1	**No Sample**	No Sample		No Sample		No Sample	
9 AOR06070-1KF	**4.0**	13	0	1.3	1.0	13	12
10 AOR07781-5	**No Sample**	No Sample		No Sample		No Sample	
11 CO08065-2RU	**3.2**	75	33	2.8	1.8	16	18
12 CO08155-2RU/Y	**3.3**	54	13	2.2	1.3	12	13
LSD 0.05	*0.4*	*27*	*19*			*4*	*4*
Average	3.4	57.9	10.2	2.5	1.2	14.9	15.0
Oregon							
1 Ranger Russet	**3.1**	79	4	3.3	1.1	12	11
2 Russet Burbank	**2.9**	63	4	2.5	1.1	14	15
3 A03141-6	**No Sample**	No Sample		No Sample		No Sample	
4 A06030-23	**3.4**	67	4	2.7	1.1	13	14
5 A07061-6	**3.2**	8	0	1.2	1.0	9	9
6 A08433-4VR	**3.4**	13	0	1.4	1.0	14	14
7 AO03123-2	**3.8**	17	0	1.3	1.0	9	10
8 AO06191-1	**3.4**	67	13	2.7	1.2	10	12
9 AOR06070-1KF	**3.6**	13	0	1.4	1.0	13	13
10 AOR07781-5	**3.6**	8	0	1.3	1.0	13	17
11 CO08065-2RU	**3.7**	38	21	1.9	1.5	13	11
12 CO08155-2RU/Y	**3.2**	8	0	1.2	1.0	9	10
LSD 0.05	*0.3*	*25*	*12*			*3*	*4*
Average	3.4	34.5	4.2	1.9	1.1	11.6	12.4

Date test performed:

Washington	Oct. 10	Oct. 20	Nov. 10
Idaho	Oct. 16	Oct. 26	Nov. 16
Oregon	Oct. 11	Oct. 27	Nov. 21

2017 Late Harvest Regional Trial

Stored at 48°F for 60 Days

Clone	PHOTOVOLT READING stem	bud	average	rtg §	DIFF	USDA COLOR	% REDUCING SUGAR stem	bud	SPROUTING (%)	length (in)
Washington										
1 Ranger Russet	26.3	42.5	34.4	**3-**	16.2	1	1.8	0.6	100	0.50
2 Russet Burbank	22.3	44.6	33.4	**3-**	22.3	2	2.3	0.6	0	
3 A03141-6	34.4	42.5	38.5	**4-**	10.4	0	1.0	0.6	0	
4 A06030-23	48.5	49.8	49.1	**5+**	5.1	0	0.5	0.5	27	0.13
5 A07061-6	26.4	41.9	34.1	**3-**	15.6	1	1.8	0.7	100	0.50
6 A08433-4VR	27.5	39.5	33.5	**3-**	12.0	1	1.6	0.8	53	0.25
7 AO03123-2	31.5	45.6	38.5	**4-**	14.1	0	1.3	0.6	0	
8 AO06191-1	35.9	47.8	41.8	**5-**	12.1	0	0.9	0.5	0	
9 AOR06070-1KF	34.6	45.6	40.1	**4-**	14.6	0	1.0	0.6	33	0.13
10 AOR07781-5	35.6	54.5	45.0	**5-**	18.9	0	1.0	0.5	100	0.50
11 CO08065-2RU	35.0	50.7	42.8	**5-**	15.6	0	1.0	0.5	27	0.13
12 CO08155-2RU/Y	35.6	47.3	41.5	**5-**	11.6	0	1.0	0.5	87	1.00
		LSD 0.05	*3.6*		*5.2*				*19*	
Average	32.8	46.0	39.4		14.0	0	1.3	0.6	44	
Idaho										
1 Ranger Russet			No Sample				No Sample		No Sample	
2 Russet Burbank	20.8	41.3	31.1	**3-**	20.5	2	2.5	0.7	0	
3 A03141-6	26.1	34.2	30.2	**2-**	11.2	1	1.8	1.0	80	0.25
4 A06030-23	26.8	45.4	36.1	**4-**	18.6	1	1.7	0.6	100	0.13
5 A07061-6	45.9	47.3	46.6	**5+**	5.2	0	0.5	0.5	0	
6 A08433-4VR	29.0	45.5	37.2	**4-**	16.5	1	1.5	0.6	14	0.13
7 AO03123-2	39.6	47.2	43.4	**5+**	8.1	0	0.7	0.5	100	0.25
8 AO06191-1			No Sample				No Sample		No Sample	
9 AOR06070-1KF	44.1	49.5	46.8	**5+**	8.9	0	0.6	0.5	53	0.13
10 AOR07781-5			No Sample				No Sample		No Sample	
11 CO08065-2RU	29.7	34.2	32.0	**3+**	8.5	1	1.4	1.0	7	0.25
12 CO08155-2RU/Y	30.3	40.7	35.5	**4-**	10.6	1	1.4	0.7	0	
		LSD 0.05	*4.0*		*5.1*				*20*	
Average	32.5	42.8	37.6		12.0	1	1.4	0.7	39	
Oregon										
1 Ranger Russet	25.2	41.8	33.5	**3-**	17.2	1	1.9	0.7	83	1.00
2 Russet Burbank	22.0	45.2	33.6	**3-**	23.1	2	2.4	0.6	20	0.13
3 A03141-6			No Sample				No Sample		No Sample	
4 A06030-23	44.2	51.9	48.0	**5+**	7.8	0	0.6	0.5	100	0.25
5 A07061-6	28.0	45.6	36.7	**4-**	17.4	1	1.6	0.6	100	1.50
6 A08433-4VR	32.5	43.6	38.0	**4-**	11.1	0	1.2	0.6	100	0.13
7 AO03123-2	27.5	44.3	35.9	**4-**	20.0	1	1.7	0.6	20	0.13
8 AO06191-1	31.5	49.9	40.7	**5-**	18.5	0	1.3	0.5	0	
9 AOR06070-1KF	35.9	48.1	42.0	**5-**	19.9	0	0.9	0.5	80	0.50
10 AOR07781-5	28.7	49.9	39.3	**4-**	21.2	1	1.5	0.5	100	0.50
11 CO08065-2RU	41.8	48.1	44.9	**5-**	11.4	0	0.7	0.5	93	1.00
12 CO08155-2RU/Y	41.7	45.0	43.3	**5+**	7.4	0	0.7	0.6	100	1.00
		LSD 0.05	*5.3*		*7.1*				*17*	
Average	32.6	46.7	39.6		15.9	1	1.3	0.6	72	

Date test performed:

Washington	Nov. 27	Nov. 27	Dec. 18
Idaho	Dec. 3	Dec. 3	Dec. 19
Oregon	Dec. 8	Dec. 8	Dec. 19

§ 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.

2017 Late Harvest Regional Trial

Stored at 44°F for 60 Days

Clone	PHOTOVOLT READING stem	bud	average	rtg §	DIFF	USDA COLOR	% REDUCING SUGAR stem	bud
Washington								
1 Ranger Russet	27.6	39.2	33.4	**3-**	11.6	1	1.6	0.8
2 Russet Burbank	20.8	39.6	30.2	**2-**	18.8	2	2.6	0.8
3 A03141-6	33.9	42.1	38.0	**4-**	10.3	0	1.1	0.6
4 A06030-23	36.3	43.3	39.8	**4+**	8.5	0	0.9	0.6
5 A07061-6	29.6	42.6	36.1	**4-**	13.0	1	1.4	0.6
6 A08433-4VR	20.3	31.8	26.0	**2-**	12.2	2	2.6	1.2
7 AO03123-2	31.1	47.2	39.1	**4-**	16.1	0	1.3	0.5
8 AO06191-1	29.5	41.5	35.5	**4-**	11.9	1	1.4	0.7
9 AOR06070-1KF	36.9	50.5	43.7	**5-**	13.6	0	0.9	0.5
10 AOR07781-5	33.1	49.7	41.4	**5-**	16.6	0	1.1	0.5
11 CO08065-2RU	34.4	50.0	42.2	**5-**	16.8	0	1.0	0.5
12 CO08155-2RU/Y	27.7	41.3	34.5	**3-**	14.5	1	1.6	0.7
		LSD 0.05	*3.2*		*5.0*			
Average	30.1	43.2	36.7		13.7	1	1.5	0.7
Idaho								
1 Ranger Russet	No Sample						No Sample	
2 Russet Burbank	21.2	32.2	26.7	**2-**	11.0	2	2.5	1.2
3 A03141-6	22.6	32.8	27.7	**2-**	10.2	2	2.3	1.2
4 A06030-23	25.9	43.6	34.7	**3-**	17.7	1	1.8	0.6
5 A07061-6	40.9	47.3	44.1	**5+**	7.1	0	0.7	0.5
6 A08433-4VR	25.7	36.8	31.2	**3-**	13.1	1	1.9	0.9
7 AO03123-2	38.1	44.3	41.2	**5+**	6.2	0	0.8	0.6
8 AO06191-1	No Sample						No Sample	
9 AOR06070-1KF	37.8	47.5	42.7	**5-**	10.6	0	0.8	0.5
10 AOR07781-5	No Sample						No Sample	
11 CO08065-2RU	30.2	39.7	35.0	**3-**	9.6	1	1.4	0.7
12 CO08155-2RU/Y	34.8	37.8	36.3	**4+**	6.5	0	1.0	0.8
		LSD 0.05	*3.6*		*4.4*			
Average	30.8	40.2	35.5		10.2	1	1.5	0.8
Oregon								
1 Ranger Russet	27.1	41.8	34.4	**3-**	14.6	1	1.7	0.7
2 Russet Burbank	20.9	41.0	31.0	**3-**	20.2	2	2.5	0.7
3 A03141-6	No Sample						No Sample	
4 A06030-23	42.3	49.6	46.0	**5+**	7.3	0	0.6	0.5
5 A07061-6	27.8	46.2	37.8	**4-**	18.7	1	1.6	0.5
6 A08433-4VR	34.3	46.3	40.3	**4-**	12.9	0	1.0	0.5
7 AO03123-2	35.4	53.1	44.3	**5-**	17.8	0	1.0	0.6
8 AO06191-1	34.1	49.7	41.9	**5-**	15.6	0	1.1	0.5
9 AOR06070-1KF	27.6	47.3	37.4	**4-**	19.6	1	1.6	0.5
10 AOR07781-5	29.1	50.5	39.8	**4-**	21.4	1	1.5	0.5
11 CO08065-2RU	29.6	46.9	38.3	**4-**	17.3	1	1.4	0.5
12 CO08155-2RU/Y	27.9	37.5	32.7	**3-**	12.5	1	1.6	0.8
		LSD 0.05	*4.9*		*7.3*			
Average	30.6	46.4	38.5		16.2	1	1.4	0.6

Date test performed:

Washington	Nov. 28	Nov. 28
Idaho	Dec. 4	Dec. 4
Oregon	Dec. 10	Dec. 10

§ 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.

2017 Late Harvest Regional Trial

Stored at 40°F for 60 Days and Reconditioned

		PHOTOVOLT(60 Days at 40°F)						PHOTOVOLT AFTER RECONDITIONING (21 days at 60°F)				
Clone	SPROUTING (%)	stem	bud	average	rtg §	DIFF	USDA COLOR	stem	bud	average	DIFF	USDA COLOR
Washington												
1 Ranger Russet	0	18.0	29.7	23.8	**1**	11.8	3	20.6	42.8	31.7	22.2	2
2 Russet Burbank	0	12.3	22.7	17.5	**0**	10.5	4	12.6	34.7	23.7	22.1	4
3 A03141-6	0	21.7	26.5	24.1	**1**	5.5	2	22.0	35.5	28.7	14.2	2
4 A06030-23	0	24.5	25.7	25.1	**2**	3.4	1	31.9	41.8	37.9	10.1	0
5 A07061-6	0	15.9	23.1	19.5	**1**	7.2	3	19.4	34.5	26.9	16.7	3
6 A08433-4VR	0	11.5	18.5	15.0	**0**	6.9	4	17.0	27.1	22.0	10.2	3
7 AO03123-2	0	16.3	24.6	20.4	**1**	8.3	3	21.0	32.9	26.9	12.5	2
8 AO06191-1	0	16.6	23.9	20.3	**1**	7.3	3	23.6	36.9	30.2	15.4	2
9 AOR06070-1KF	0	18.3	32.7	25.5	**2**	14.4	3	23.0	42.5	32.7	19.5	2
10 AOR07781-5	0	19.0	31.0	25.0	**2**	12.0	3	25.2	47.5	36.4	22.3	1
11 CO08065-2RU	0	17.8	33.0	25.4	**2**	15.2	3	24.9	47.3	36.1	22.4	1
12 CO08155-2RU/Y	0	19.5	26.9	23.2	**1**	7.6	2	16.1	29.8	22.9	13.9	3
LSD 0.05	*ns*			*2.5*		*3.4*				*3.3*	*5.6*	
Average	0	17.6	26.5	22.1		9.2	3	21.4	37.8	29.7	16.8	2
Idaho												
1 Ranger Russet	No Sample			No Sample						No Sample		
2 Russet Burbank	0	13.2	24.0	18.6	**0**	11.7	4	19.9	40.3	30.1	20.4	2
3 A03141-6	0	17.9	23.9	20.9	**1**	7.2	3	18.0	25.5	21.8	7.6	3
4 A06030-23	0	30.3	46.0	38.2	**4**	15.7	1	25.4	45.0	35.2	21.4	1
5 A07061-6	0	27.1	28.3	27.7	**2**	4.1	1	35.8	41.5	38.8	6.6	0
6 A08433-4VR	0	15.4	28.2	21.8	**1**	12.8	3	20.8	44.6	32.7	24.6	2
7 AO03123-2	0	21.7	26.4	24.1	**1**	4.7	2	34.2	42.3	38.2	8.9	0
8 AO06191-1	No Sample			No Sample						No Sample		
9 AOR06070-1KF	0	22.3	28.0	25.2	**2**	6.7	2	30.0	36.9	33.4	7.6	1
10 AOR07781-5	No Sample			No Sample						No Sample		
11 CO08065-2RU	0	18.0	22.7	20.3	**1**	4.9	3	20.2	35.1	27.6	15.0	2
12 CO08155-2RU/Y	0	18.9	19.2	19.1	**0**	2.8	3	30.4	32.5	31.4	5.8	1
LSD 0.05	*ns*			*3.2*		*4.2*				*4.3*	*5.8*	
Average	0	20.5	27.4	24.0		7.8	2	26.1	38.2	32.1	13.1	1
Oregon												
1 Ranger Russet	0	14.6	23.4	19.0	**0**	8.9	3	18.6	36.1	27.4	17.5	3
2 Russet Burbank	0	14.8	20.3	17.6	**0**	5.9	3	16.9	29.4	23.1	13.9	3
3 A03141-6	No Sample			No Sample						No Sample		
4 A06030-23	0	22.3	29.8	26.1	**2**	7.5	2	30.6	43.9	37.3	16.8	0
5 A07061-6	43	17.8	27.8	23.2	**1**	11.0	3	23.1	37.2	31.1	14.2	2
6 A08433-4VR	0	17.3	24.8	21.0	**1**	7.7	3	34.9	46.8	40.8	12.0	0
7 AO03123-2	0	19.5	30.8	25.1	**2**	11.3	2	25.2	49.0	37.1	23.9	1
8 AO06191-1	0	22.6	34.5	28.6	**2**	11.9	2	25.8	45.8	35.8	20.0	1
9 AOR06070-1KF	7	21.5	38.7	30.1	**2**	17.9	2	20.1	46.5	33.3	26.4	2
10 AOR07781-5	27	20.7	35.9	28.3	**2**	15.2	2	27.3	51.6	39.4	24.2	1
11 CO08065-2RU	0	23.2	43.9	33.6	**3**	20.7	2	36.5	53.9	45.2	17.5	0
12 CO08155-2RU/Y	20	26.2	28.5	27.4	**2**	4.7	1	24.9	30.2	27.6	7.0	1
LSD 0.05	*16*			*3.6*		*5.5*				*4.9*	*7.5*	
Average	9	20.0	30.8	25.4			AV	25.8	42.8	34.4	17.6	1

Date test performed:

Washington	Dec. 18	Nov. 29	Dec. 15
Idaho	Dec. 18	Dec. 5	Dec. 16
Oregon	Dec. 19	Dec. 14	Dec. 17

DIFF = Absolute difference between bud and stem Photovolt reading.

Entries Retained from the 2016 Trials Currently in the Regional Trial

Harvested fall of 2016 Held at 48°F until December 14 Stored at 44°F until analysis

A06030-23, A07061-6, and AOR07781-5 were advanced from the 2016 Tri-State Trial into the 2017 Regional Trial. Four clones were retained in the Regional Trial. When averaged across states, AO03123-2 (47.2 ref units), A03141-6 (46.7), and AOR06070-1KF (51.4) produced the lightest fries. A03141-6 has consistently stored well in the long-term trials over the last 3 years (2015-17), reflecting its resistance to cold-induced sweetening. Uniformity of fry color was unacceptable for the WA and OR entry, AOR07781-5. Both checks from WA also had unacceptable stem to bud fry color differences. When grown in WA, some tubers from AOR06070-1KF produced mottled fries. All entries sprouted over the 7-month storage period. Consistent with last year's trial, AO06191-1 had the longest dormancy as indicated by the shortest sprouts (0.5 and 0.29 inches in 2016 and 2017, respectively).

	PHOTOVOLT READING				USDA	% REDUCING SUGAR			Sprouting	
Clone	stem	bud	avg	DIFF	COLOR	stem	bud	avg	percent	length (in.)
Washington										
1 Ranger Russet	28.4	39.1	33.7	10.9	1	1.6	0.8	1.2	100	3.5
2 Russet Burbank	31.8	42.3	37.1	10.9	0	1.2	0.6	0.9	100	3.0
3 A03141-6	47.4	48.2	47.8	2.9	0	0.5	0.5	0.5	100	2.0
4 A06030-23 §	48.5	42.4	45.5	6.3	0	0.5	0.6	0.6	100	6.0
5 A07061-6 §	36.7	44.0	40.4	7.6	0	0.9	0.6	0.7	100	4.5
6 AO03123-2	44.2	47.5	45.9	5.3	0	0.6	0.5	0.6	100	3.5
7 AO06191-1	36.3	44.2	40.2	7.9	0	0.9	0.6	0.8	100	0.3
8 AOR06070-1KF	44.9	45.4	45.1	3.6	0	0.6	0.6	0.6	100	7.0
9 AOR07781-5 §	39.8	46.5	43.2	9.0	0	0.7	0.5	0.6	100	3.5
		LSD 0.05	*2.9*	*4.0*						
Average	38.8	44.0	41.4	7.7	0	0.7	0.5	0.7	100	
Idaho										
1 Ranger Russet	33.7	38.6	36.1	7.0	0	1.1	0.8	0.9	100	4.0
2 Russet Burbank	38.2	43.4	40.8	6.3	0	0.8	0.6	0.7	100	0.1
3 A03141-6	48.3	43.6	46.0	4.7	0	0.5	0.6	0.6	100	1.0
4 A06030-23 §	50.3	46.3	48.3	5.8	0	0.5	0.5	0.5	100	3.0
5 A07061-6 §	41.8	45.1	43.4	4.9	0	0.7	0.6	0.6	100	3.0
6 AO03123-2	50.0	48.4	49.2	5.4	0	0.5	0.5	0.5	100	0.5
7 AO06191-1	39.5	43.4	41.5	4.7	0	0.8	0.6	0.7	100	0.1
8 AOR06070-1KF	44.0	45.1	44.6	3.2	0	0.6	0.6	0.6	100	5.0
9 AOR07781-5 §	46.2	47.4	46.8	5.3	0	0.5	0.5	0.5	100	2.0
		LSD 0.05	*4.4*	*3.1*						
Average	43.6	44.6	44.1	5.2	0	0.7	0.6	0.6	100	
Oregon										
1 Ranger Russet	30.0	28.9	29.5	3.2	1	1.4	1.5	1.4	100	4.0
2 Russet Burbank	31.9	33.6	32.8	5.3	0	1.2	1.1	1.2	100	5.5
3 A03141-6	44.7	47.8	46.3	6.1	0	0.6	0.5	0.6	100	2.0
4 A06030-23 §	45.2	40.2	42.7	6.8	0	0.6	0.7	0.6	100	0.5
5 A07061-6 §	38.9	38.9	38.9	4.0	0	0.8	0.8	0.8	100	4.5
6 AO03123-2	43.2	49.7	46.4	6.6	0	0.6	0.5	0.6	100	2.0
7 AO06191-1	35.5	39.1	37.3	4.0	0	1.0	0.8	0.9	100	0.5
8 AOR06070-1KF	44.6	49.0	46.8	5.2	0	0.6	0.5	0.6	100	2.0
9 AOR07781-5 §	40.0	47.8	43.9	9.3	0	0.7	0.5	0.6	100	2.0
		LSD 0.05	*3.6*	*4.1*						
Average	39.3	41.7	40.5	5.6	0	0.8	0.8	0.8	100	

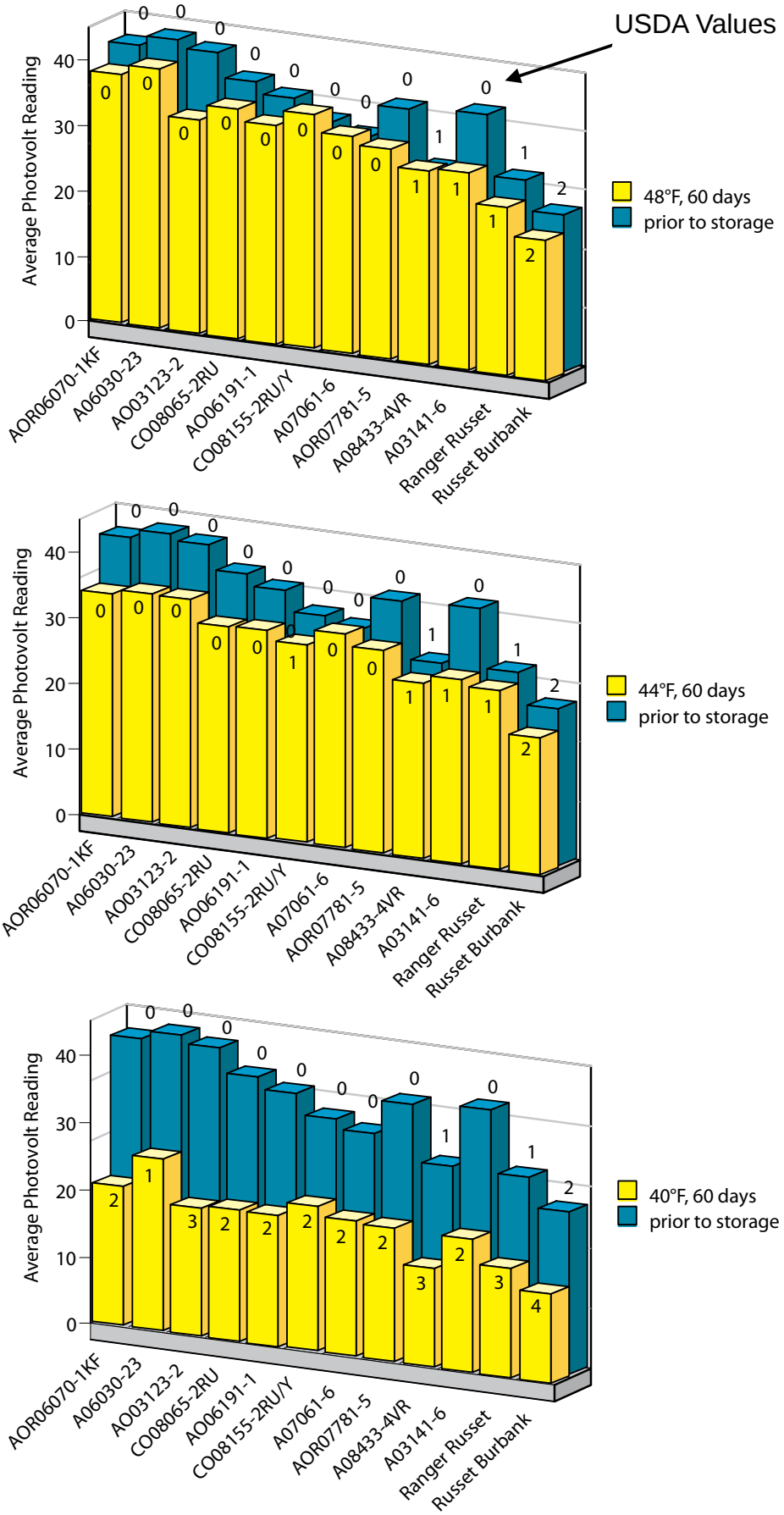
§ Advanced from 2016 Tri-State Trial.

Date test performed:

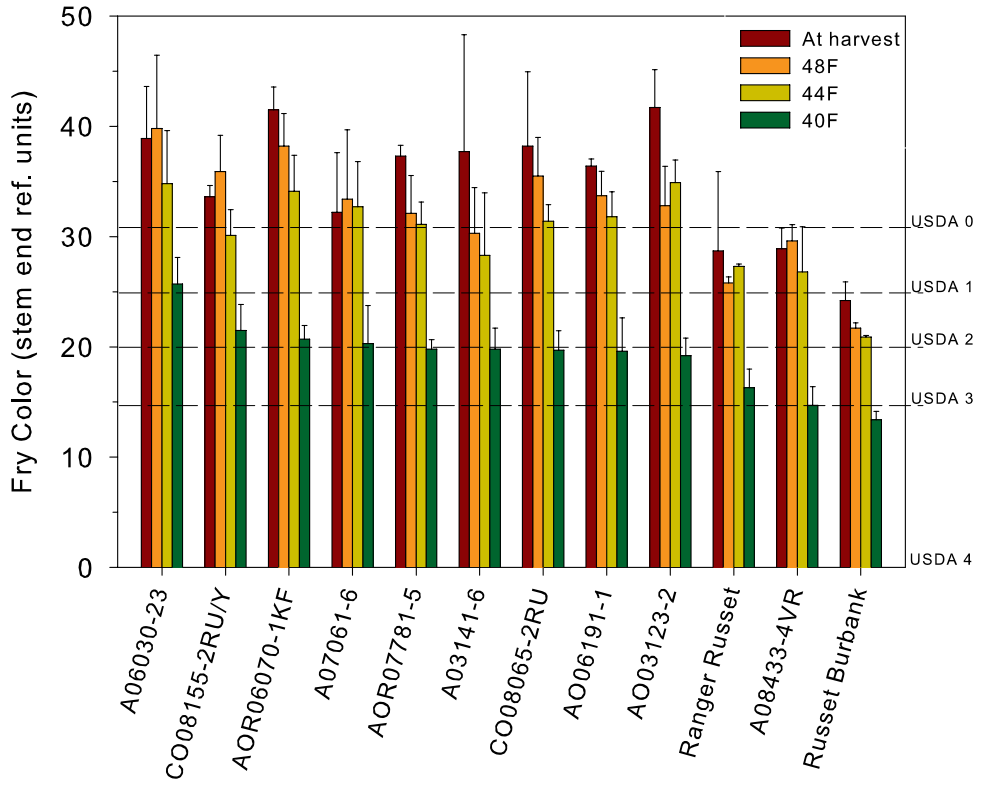
Washington	May 1
Idaho	May 2
Oregon	May 3

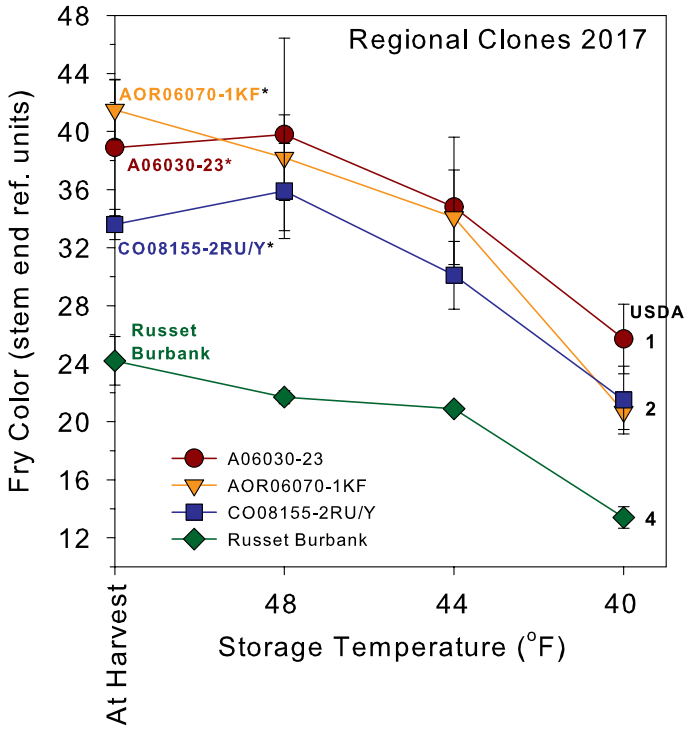
2017 Late Harvest Regional Trial

Regional Trial - 3 State Average of Stem End



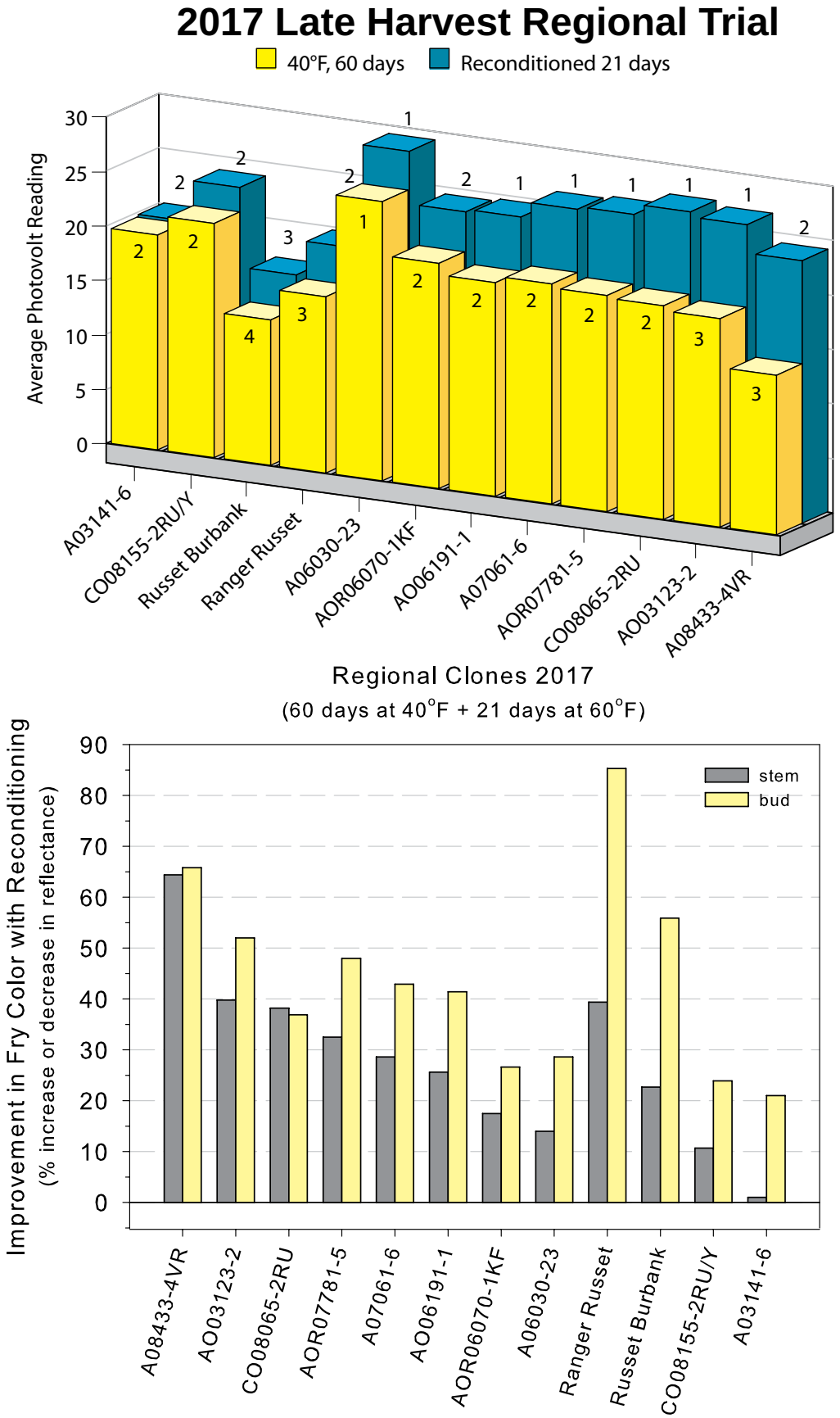
2017 Late Harvest Regional Trial





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 (A06030-23, AOR06070-1KF, and CO08155-2RU/Y) and susceptible (Russet Burbank) clones in the Regional Trial. *Indicates similar performance of the clones last year.

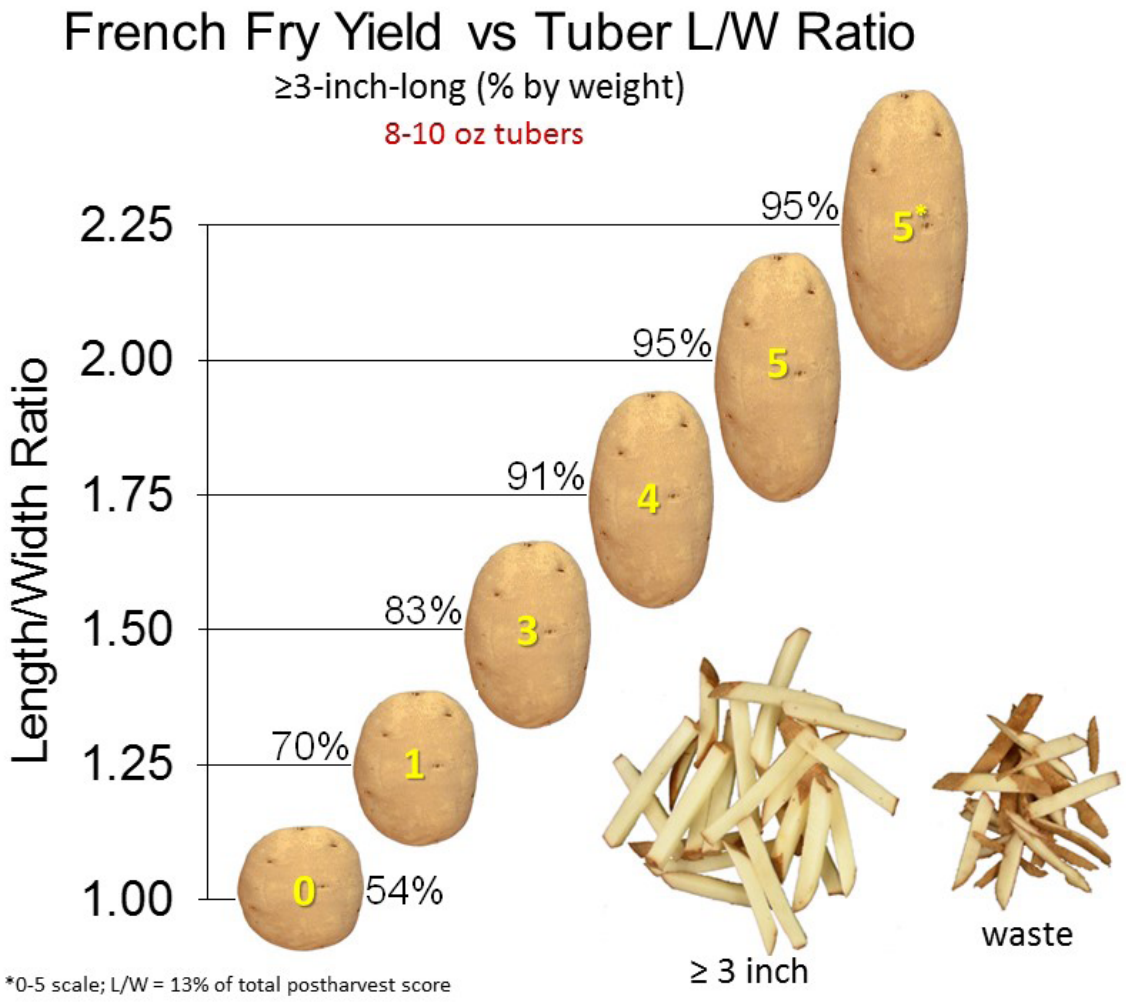


Reconditioning abilities of clones in the 2017 Regional Trial (3-state averages). Clones were stored at 40°F for 60 days after harvest and then reconditioned at 60°F for 21 days. **Top:** Stem end fry color before and after reconditioning. Numbers in bars indicate the USDA color rating of the stem end. **Bottom:** Percent improvement of stem and bud end fry color with reconditioning.

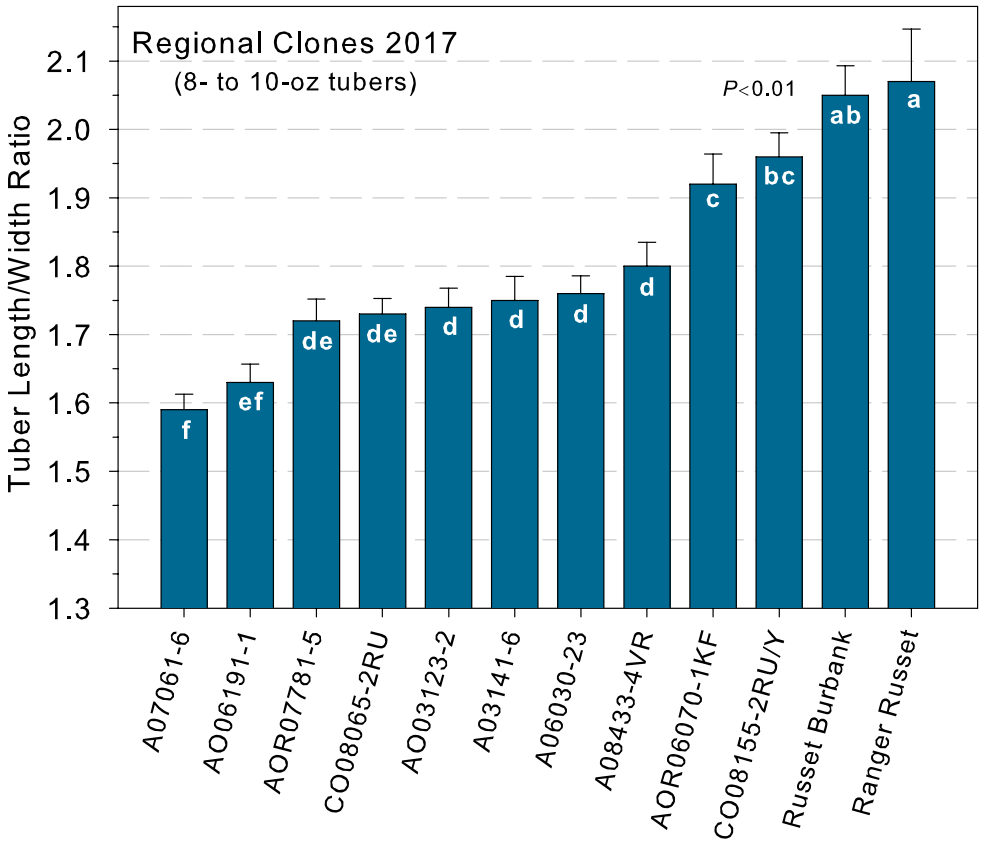
2017 Late Harvest Regional Trial

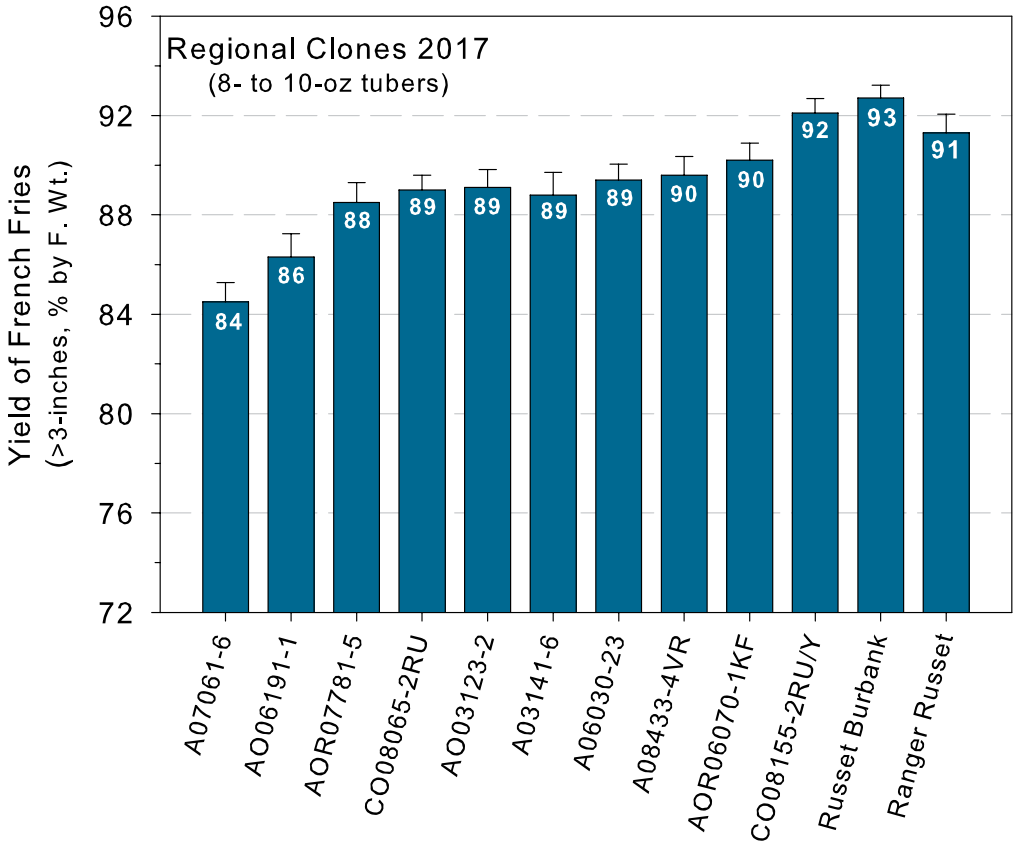
Length to Width Ratios of 8-10 oz Tubers

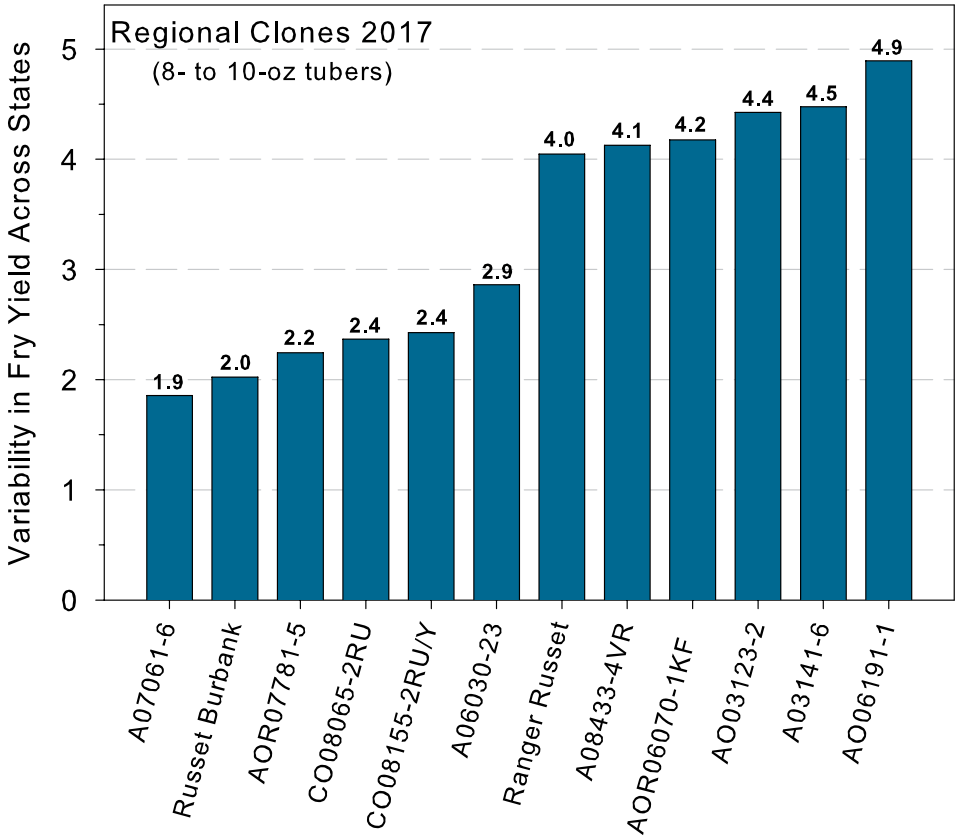
Clone	Length to width ratio WA	rtg §	ID	rtg §	OR	rtg §	3 State Avg.
1 Ranger Russet	1.67	**4**	No Sample		2.47	**5**	2.07
2 Russet Burbank	1.76	**4**	2.29	**5**	2.09	**5**	2.05
3 A03141-6	1.57	**3**	1.92	**5**	No Sample		1.75
4 A06030-23	1.61	**3**	1.90	**5**	1.78	**4**	1.76
5 A07061-6	1.53	**3**	1.65	**4**	1.57	**3**	1.59
6 A08433-4VR	1.60	**3**	2.10	**5**	1.71	**4**	1.80
7 AO03123-2	1.81	**5**	1.53	**3**	1.87	**5**	1.74
8 AO06191-1	1.49	**2**	No Sample		1.78	**4**	1.63
9 AOR06070-1KF	1.59	**3**	2.37	**5**	1.79	**4**	1.92
10 AOR07781-5	1.62	**3**	No Sample		1.83	**5**	1.72
11 CO08065-2RU	1.62	**3**	1.84	**5**	1.72	**4**	1.73
12 CO08155-2RU/Y	1.95	**5**	2.20	**5**	1.73	**4**	1.96
Average	1.65		1.98		1.85		1.81



2017 Late Harvest Regional Trial







Relative ranking of clones in the Late Season Regional Trial for variability in yield of French fries 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, AO06191-1 had a length to width ratio of 1.63 (page 92), resulting in 86% of the tuber yielding French fries ≥3 inches in length (page 92). Tuber shape of this entry also varied the most across production regions (above), resulting in fry yields ranging from 81% to 91% (86±4.9%).

Pages 91-92: Tuber length to width ratios and the associated percentage yield of fries. Bars with same letter are not significantly different (P≤0.01).

2017 Tri-State Specialty Trial

Location: WSU Research Center – Othello, WA
Planting Date: April 3 Vine Kill Date: July 23
Harvest Date: August 1 Days Grown: 111
In-Row Spacing: 8 Inch

The Tri-State Specialty trial is a part of the overall Tri-State Trial effort. This trial consists of clones with unique color and attributes which are primarily evaluated for fresh market suitability. This year's trial compared 3 local reference varieties to 3 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)

Yellow flesh: A06336-5Y
Suggested Discards: None.

Standcounts

- **50 Day**
  Full emergence: Yukon Gold and POR11PG62-3 (100%).
  Poor emergence: Chieftain and LaRatte (88%).

Plant and Tuber Growth & Development

- **50 Day Stems per plant**
  Most: A06336-5Y (2.4) and LaRatte (2.3).
  Fewest: Yukon Gold (1.7).

- **Average Tuber Number Per Plant**
  Most: A06336-5Y (12.6) and POR11PG62-3 (8.9).
  Fewest: Yukon Gold (5.2) and LaRatte (5.0).

- **Average Tuber Size (oz)**
  Largest: Yukon Gold (6.8), Chieftain (5.4), and A06336-2Y (3.7).
  Smallest: LaRatte (1.6) and POR11PG62-3 (1.9).

Yield Data

- **Total Yield and U.S. #1 Yield**
  Highest: Chieftain had the highest total (665 CWT/A) and the highest U.S. #1 yield (649 CWT/A).
  Lowest: LaRatte had the lowest total (120 CWT/A) and U.S. #1 yield (108 CWT/A).

- **% U.S. #1's**
  Highest: Yukon Gold and Chieftain (84%).

2017 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			Knobs	Growth Cracks	Green
Red Skin/White Flesh								
Chieftain	665	33.3	84	0	16	5.0	4.0	5.0
Yellow Flesh								
Yukon Gold	506	25.3	84	0	16	5.0	4.3	4.3
A06336-2Y	454	22.7	56	3	41	5.0	5.0	3.7
A06336-5Y	486	24.3	27	0	73	5.0	5.0	5.0
Fingerling								
LaRatte	120	6.0	13	1	86	5.0	5.0	5.0
POR11PG62-3	239	11.9	6	2	91	5.0	5.0	5.0

ENTRY	US # 1 YIELD						
	CWT/A	Tons/A	0-2 oz*	2-4 oz*	4-6 oz*	6-10 oz*	> 10 oz*
			%				
Red Skin/White Flesh							
Chieftain	649	32.4	2	12	28	42	15
Yellow Flesh							
Yukon Gold	479	23.9	2	9	14	33	42
A06336-2Y	421	21.1	6	33	38	22	1
A06336-5Y	475	23.8	14	58	24	3	0
Fingerling							
LaRatte	108	5.4	53	23	0	0	23
POR11PG62-3	216	10.8	46	47	2	0	4

ENTRY	SKIN SET 1 = Poor 5 = Good	TUBER SHAPE 1 = Round 5 = Long	60 DAY STAND % Emerged	STEMS PER PLANT Above Ground	AVERAGE TUBER WEIGHT Ounces	AVERAGE TUBER NUMBER Tubers/Plant	SIZE UNIFORMITY 1 = Poor 5 = Good	SHAPE UNIFORMITY 1 = Poor 5 = Good
Red Skin/White Flesh								
Chieftain	2.5	1.0	88	2.1	5.4	8.5	4.0	4.0
Yellow Flesh								
Yukon Gold	3.3	1.0	100	2	6.8	5.2	2.0	3.7
A06336-2Y	4.0	1.0	95	2	3.7	8.6	3.0	3.0
A06336-5Y	4.0	1.0	93	2	2.7	12.6	4.0	4.0
Fingerling								
LaRatte	4.0	5.0	88	2	1.6	5.0	4.0	2.0
POR11PG62-3	4.0	3.3	100	2	1.9	8.9	4.0	2.0

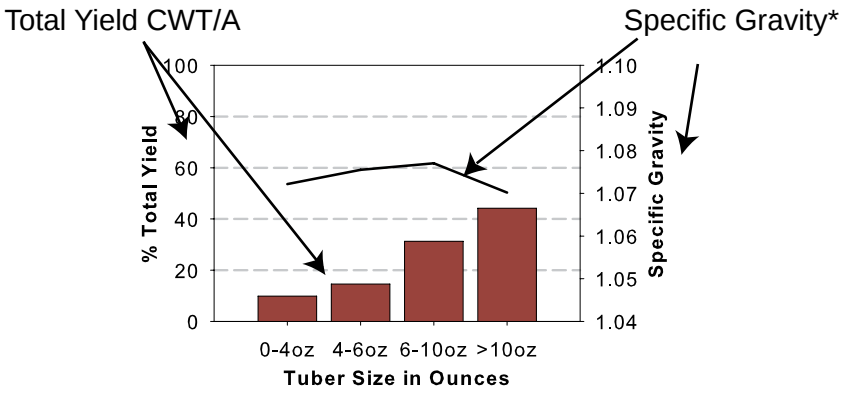
* Percent values may not total 100% due to rounding

2017 Tri-State Specialty Trial

Tuber Yield and Specific Gravity Distributions

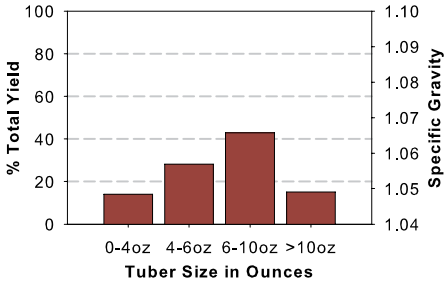
Note: Specific Gravity is based on a sample of U.S. #1 tubers within each size category

8 inch In-Row Spacing

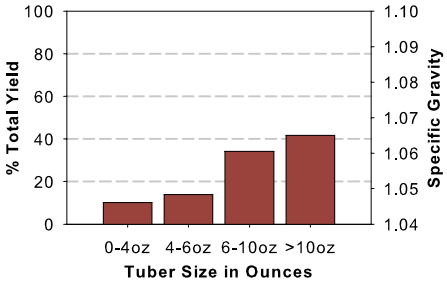


*Specific Gravities data missing from graphs as only one size was tested in 2017.

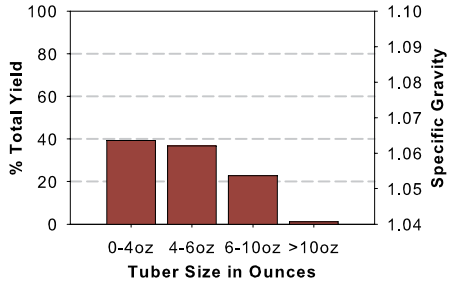
CHIEFTAIN



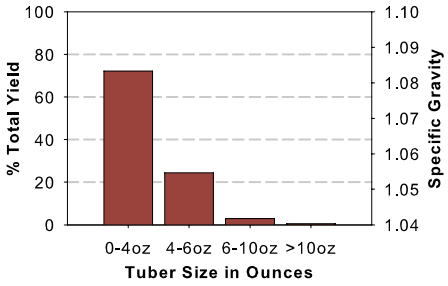
YUKON GOLD



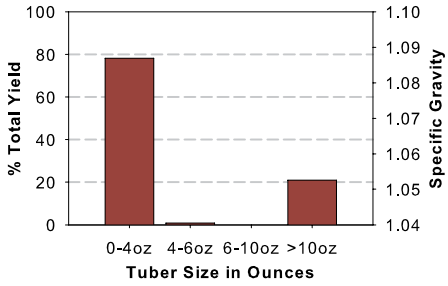
A06336-2Y



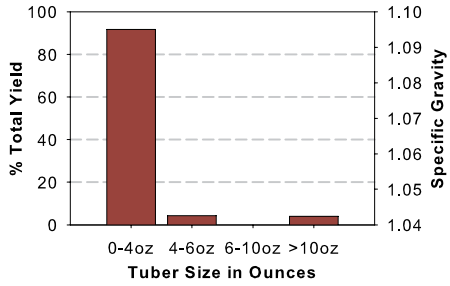
A06336-5Y



LARATTE



POR11PG62-3



Postharvest Analysis

- There were no red skinned clones in this year's trial. All entries had yellow flesh. POR-11PG62-3 has yellow skin with pink splashes. Tubers of A06336-2Y and A06336-5Y had yellow skin with a hint of pink, resulting in a peach blush color. Yukon Gold and LaRatte have yellow skin.

- The top scoring clones were Yukon Gold and POR11PG62-3 with 57.9 and 57 points, respectively, in the 2017 culinary evaluations. As in previous years, culinary scores were high with all entries receiving 73 to 77% of the total points possible.

Overall Culinary Evaluation Scores

	Clone	Boiled (25 max)	Baked (25 max)	Microwaved (25 max)	Total (75 max)
1	Yukon Gold	17.4	20.8	19.8	57.9
5	POR11PG62-3	18.0	17.5	21.5	57.0
4	LaRatte	19.5	17.2	19.9	56.5
2	A06336-2Y	17.4	19.6	18.9	55.8
3	A06336-5Y	17.1	18.8	18.8	54.7

Chipped:	Aug. 21
Boiled:	Aug. 15
Microwaved:	Aug. 16
Baked:	Aug. 17
Cooking Time:	Aug. 11

- All entries had slight after cooking darkening when baked. The texture of all baked samples except A06336-5Y was rated favorably as "creamy" or "fluffy"; A06336-5Y had a pasty texture. The flavor of most of the baked samples was acceptably rated as "bland", while LaRatte and POR-11PG62-3 received "unacceptable" flavor ratings. Tuber centers of baked samples of A06336-5Y and POR11PG62-3 received acceptable ratings of "mushy"; all other entries were rated as fully cooked. Skins of A06336-2Y baked samples were rated as "steamy", LaRatte and POR-11PG62-3 were rated as "crispy", and Yukon Gold and A06336-5Y were rated as "fully cooked".

- All entries showed slight to moderate sloughing when boiled, except A06336-5Y, which was rated severe. All boiled entries were rated "slight" to "none" fpr after cooking darkening. The texture of all boiled samples was rated favorably as "creamy". The tuber centers of all entries were rated as "mushy" or "fully cooked".

- Microwaving produced "slight" or "moderate" after cooking darkening and the texture was favorably rated as "fluffy" or "mealy" for all entries. The flavor ratings of microwaved samples ranged from "bland" to "good" for all entries except A06336-2Y, which was rated "unacceptable". Tuber center ratings of all entries except POR11PG62-3 were rated "mushy". POR11PG62-3 had "fully cooked" tuber center ratings. Skins were rated favorably as either "steamy" (Yukon Gold) or "fully cooked" following microwaving.

- A06336-2Y produced the lightest chips with a SFA color rating of 3.4. All other entries produced even darker chips, ranging from 3.6 to 4.8 on the SFA 1-5 scale (darker as a group than in most years).

2017 Washington Tri-State Specialty Trial

Specialty Clone Culinary Evaluation

Boiled

	Clone	Flavor	After Cooking Darkening	Texture	Tuber Center	Sloughing	Total Rating
1	Yukon Gold	2.8	4.7	3.4	3.5	3.0	17.4
2	A06336-2Y	3.5	4.2	2.5	4.3	3.0	17.4
3	A06336-5Y	2.4	4.5	2.8	4.2	3.2	17.1
4	LaRatte	3.3	4.5	3.3	3.6	4.8	19.5
5	POR11PG62-3	3.5	4.0	2.7	3.9	3.9	18.0
	LSD 0.05	*ns*	*0.4*	*ns*	*ns*	*0.6*	*ns*
	Average	3.1	4.4	2.9	3.9	3.6	17.9

Oven Baked

	Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
1	Yukon Gold	3.5	4.4	3.6	4.8	4.6	20.8
2	A06336-2Y	3.4	4.4	3.1	4.5	4.3	19.6
3	A06336-5Y	3.5	4.4	1.9	4.1	4.9	18.8
4	LaRatte	2.0	3.6	4.4	4.5	2.7	17.2
5	POR11PG62-3	2.5	4.0	3.9	3.8	3.4	17.5
		1.3	*0.8*	*1.1*	*1.0*	*1.2*	*ns*
	Average	*3.0*	*4.2*	*3.4*	*4.3*	*4.0*	*18.8*

Microwaved

	Clone	Flavor	After cooking Darkening	Texture	Tuber Center	Skin Rating	Total Rating
1	Yukon Gold	3.8	4.4	3.7	3.5	4.4	19.8
2	A06336-2Y	3.6	4.6	2.4	3.4	4.9	18.9
3	A06336-5Y	3.0	4.6	3.3	3.4	4.5	18.8
4	LaRatte	3.4	3.6	4.0	4.1	4.8	19.9
5	POR11PG62-3	4.0	4.4	3.9	4.5	4.7	21.5
		ns	*0.5*	*0.9*	*ns*	*ns*	*ns*
	Average	3.6	4.3	3.5	3.8	4.7	19.8

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

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 of a 90-g probe was recorded. Stem end cores averaged 5.5 min to fully cook compared with 4.3 min for bud end cores. Cooking times (stem end) ranged from 4.7 min (A06336-2Y) to 6.3 min (Yukon Gold). Average cooking times ranged from 4.4 minutes for A06336-2Y and POR11PG62-3 to 5.3 minutes for Yukon Gold and LaRatte.

Chipping and Boiling Evaluations

		(Chips)	(BOILED Cooking Time)		
		Av of 6 raters	Time to Breakdown (min)		
	Clone	SFA	Stem	Bud	Average
1	Yukon Gold	4.8	6.3	4.3	5.3
2	A06336-2Y	3.4	4.7	4.0	4.4
3	A06336-5Y	3.9	5.7	4.6	5.1
4	LaRatte	3.6	5.7	4.9	5.3
5	POR11PG62-3	3.8	5.0	3.8	4.4
	*LSD 0.05 **		*1.5*	*0.5*	
	Average	3.9	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).

Tubers	WA Tri-State Specialty Trial Comments
A06336-2Y	
	**Tubers:** Round tubers. Good skin set; very shallow eyes. **Baked:** slight after cooking darkening, creamy texture, bland flavor, fully cooked tuber center, steamy skin. **Boiled:** slight sloughing, slight after cooking darkening, creamy texture, good flavor, mushy tuber center. **Microwaved:** slight after cooking darkening, mealy texture, unacceptable flavor, mushy tuber center, fully cooked skin.
A06336-5Y	
	**Tubers:** Round tubers. Good skin set; shallow eyes. **Baked:** slight after cooking darkening, pasty texture, bland flavor, mushy tuber center, fully cooked skin. **Boiled:** Severe sloughing, none after cooking darkening, creamy texture, good flavor, mushy tuber center. **Microwaved:** moderate after cooking darkening, mealy texture, bland flavor, mushy tuber center, fully cooked skin.
LaRatte	
	**Tubers:** Long tubers Good skin set; shallow eyes. **Baked:** slight after cooking darkening, fluffy texture, unacceptable flavor, fully cooked tuber center, crispy skin. **Boiled:** moderate sloughing, none after cooking darkening, creamy texture, good flavor, fully cooked tuber center. **Microwaved:** moderate after cooking darkening, fluffy texture, good flavor, mushy tuber center, fully cooked skin.
POR11PG62-3	
	**Tubers:** Oblong tubers. Good skin set; shallow eyes. **Baked:** slight after cooking darkening, fluffy texture, unacceptable flavor, mushy tuber center, crispy skin. **Boiled:** slight sloughing, slight after cooking darkening, creamy texture, good flavor, mushy tuber center. **Microwaved:** slight after cooking darkening, fluffy texture, good flavor, fully cooked tuber center, fully cooked skin.

Chips	Baked	Boiled	Microwaved
A06336-2Y			
			
A06336-5Y			
			
LaRatte			
			
POR11PG62-3			
			

Index of Clones and Cultivars