2015 POTATO VARIETY DEVELOPMENT IN TULELAKE, CA

Three variety trials were grown at the Intermountain Research and Extension Center during 2015. Trials were categorized by their market type and included russet, specialty and chip. Trial results are summarized in this report.

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2015 Annual Progress Report
Potato Variety Development in Tulelake

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Tables and variety notes were prepared by Kevin Nicholson and Skyler Peterson

Three potato variety trials were conducted at the Intermountain Research and Extension Center (IREC) in Tulelake, CA. Trials were categorized by market type and included a Russet trial with 21 entries, a Specialty trial with 20 entries, and a Chipping trial with nine entries. Entries included selections from the Western Regional (WR) variety development program, Southwest Regional (SWR) variety development program, and varieties of local interest.

Growing Conditions: Planting and harvest occurred within a week of the five year average. Air and soil temperatures were warmer than normal in early spring continuing into summer. Late blight was discovered in neighboring fields in Tulelake, which led to an increase in preventative fungicide applications. No late blight was observed in the trial area. Trials were planted in a field with a known history of Verticillium wilt, and early die symptoms were observed in all trials. Weather data can be found at: http://www.cimis.water.ca.gov Station # 91.

Late Russet Variety Trial

The Late Russet Variety Trial is a combination of 19 entries from the Western Regional Variety Trial (WR) and two entries from the Southwest Regional Trial (SWR). Merit scoring and culls were evaluated considering fresh market standards, given most Russets grown in Tulelake, CA are sold for fresh market. Data was collected for several vine and tuber characteristics. Important characteristics for the local area include total and percent US No. 1 yield, fresh merit score, tuber shape uniformity, low internal and external defects, and Verticillium wilt resistance. See Tables 1-4 for Russet results and Figure 1 for entry pictures and comments.

Trial Information

Location:	Intermountain Research and Extension Center, Tulelake, CA
Soil Type:	Tulebasin mucky silty clay loam
Planting Date:	May 14th 2015
Vine Kill Date:	September 2nd 2015
Days to Vine Kill:	111
Harvest Date:	September 30th 2015
Irrigation:	Solid-set sprinklers; applied water + precipitation = 24.66 inches
Plot Length:	18.3 Feet
In-Row Spacing:	10 Inches
Row Spacing:	36 Inch
Number of Reps:	4
# of Fertilizer/Acre:	204.6 N, 104 P205, 100 K, 36 S
Seed Treatment:	Maxim 4FS and Fir Bark Dust
Weed Control:	Roundup PowerMax, Prowl H2O, and Outlook (pre-emergence)
	Matrix (early post-emergence)
Insecticides:	Admire Pro (in-furrow) and Vydate
Fungicides:	Quadris (in-furrow) and foliar late blight fungicide program
Vine Kill Method:	Rolling and Reglone at labeled rates

Results

Tuber Count and Size

- **Tubers Per Plant**
  Highest: COTX09052-2Ru (7.5), POR06V12-3 (7.4), Ranger Russet (7.2)
  Lowest: A03141-6 (4.6), CO05175-1RU (5.0)

- **Average Tuber Size (oz.)**
  Largest: A03141-6 (10.0), Russet Norkotah (7.3)
  Smallest: CO07015-4RU (5.1), AC05039-2RU (5.2), COTX09052-2Ru (5.2), TX08352-5Ru (5.2)

- **Undersized Tubers <4oz. (cwt/A)**
  Most: COTX09052-2Ru (90), POR06V12-3 (85), A06021-1T (84)
  Least: A03141-6 (15), CO05175-1RU (37), OR05039-4 (40)

Yield

- **Total Yield (cwt/A)**
  Highest: A03141-6 (496), Ranger Russet (481)
  Lowest: TX08352-5Ru (299), COTX09022-3RuRE/Y (312)

- **U.S. No. 1's Yield (cwt/A)**
  Highest: A03141-6 (402), CO05068-1RU (395), Ranger Russet (389)
  Lowest: TX08352-5Ru (214), COTX09022-3RuRE/Y (215)

Tuber Defect Incidence

- **Hollow Heart**
  Notable Entries: Russet Norkotah (23%), CO05175-1RU (15%), AOR06070-1KF (10%)

- **Knobs**
  Notable Entries: A06084-1TE (12.3%)

- **Growth Cracks**
  Notable Entries: COTX09022-3RuRE/Y (10.9%)

- **Greening**
  Notable Entries: A03921-2 (7.5%)

Potato Early Dying Susceptibility

- **Area Under the Disease Progress Curve (Higher value is more susceptible)**
  Most Susceptible: TX08352-5Ru (1583), Russet Norkotah (1313), CO07015-4RU (1304)
  Least Susceptible: A03141-6 (478), AOR06070-1KF (501), AO03123-2 (504), A06084-1TE (504)

Table 1. Tuber Yield and Size of Experimental and Standard Russet Skinned Potato Entries.

		Tuber Yield (cwt/A)								
		U.S. No. 1's (cwt)								
Clone/Variety	Trial	Total 1's	>14oz	10-14oz	6-10oz	4-6oz	<4oz	2's + culls	Total Yield	% 1's
Ranger Russet	WR	389	46	93	168	81	66	25	481	81
Russet Burbank	WR	315	26	60	150	79	58	41	416	76
Russet Norkotah	WR	331	110	67	108	45	41	30	402	82
A03141-6	WR	402	177	110	85	29	15	80	496	81
A03921-2	WR	311	60	71	115	65	58	89	458	68
A06021-1T	WR	357	69	96	129	62	44	22	423	84
A06084-1TE	WR	263	31	59	110	62	56	94	412	64
A06862-18VR	WR	339	66	84	125	64	44	64	447	76
A06914-3CR	WR	372	31	96	175	71	42	52	466	80
AC05039-2RU	WR	257	19	46	115	76	68	18	342	75
AO03123-2	WR	267	27	53	119	68	56	32	355	75
AOR06070-1KF	WR	361	79	99	133	50	41	51	453	80
CO05068-1RU	WR	395	44	94	174	84	49	20	464	85
CO05175-1RU	WR	307	71	70	113	53	37	46	390	79
COTX09022-3RuRE/Y	WR	215	33	45	81	56	54	42	312	69
COTX09052-2Ru	WR	313	19	63	140	91	90	26	430	73
OR05039-4	WR	327	15	66	174	73	40	17	384	85
POR06V12-3	WR	275	20	48	115	92	85	72	431	64
TX08352-5Ru	WR	214	15	37	91	71	63	22	299	72
CO07015-4RU	SWR	292	14	53	126	99	82	11	385	76
CO07049-1RU	SWR	345	62	76	134	74	62	38	445	78
Mean		**317**	**49**	**71**	**128**	**69**	**55**	**42**	**414**	**76**
95% CI		**30**	**16**	**14**	**20**	**12**	**9**	**17**	**33**	**4**

Table 2. External Tuber Characteristics of Experimental and Standard Russet Skinned Potato Entries.

Clone/Variety	Trial	Merit Score[1]	Russeting[2]	Eye Depth[3]	Shape Uniformity[5]	Length/Width Ratio[6]
Ranger Russet	WR	2.5	2.6	3.5	2.8	2.01
Russet Burbank	WR	2.9	3.0	3.9	3.5	1.97
Russet Norkotah	WR	2.9	3.6	3.5	3.3	1.86
A03141-6	WR	2.3	2.6	3.6	2.4	1.65
A03921-2	WR	1.6	1.5	4.3	3.3	1.63
A06021-1T	WR	3.0	3.8	4.0	3.6	1.74
A06084-1TE	WR	2.8	3.0	3.6	3.6	2.00
A06862-18VR	WR	2.6	2.8	3.8	2.9	1.33
A06914-3CR	WR	1.9	1.8	3.5	2.6	1.59
AC05039-2RU	WR	2.5	2.8	3.6	3.3	1.74
AO03123-2	WR	2.4	2.8	3.8	3.0	1.67
AOR06070-1KF	WR	2.8	2.8	3.9	3.3	1.91
CO05068-1RU	WR	2.1	2.3	3.4	3.0	1.53
CO05175-1RU	WR	3.1	3.0	3.8	3.4	1.70
COTX09022-3RuRE/Y	WR	1.0	2.8	4.3	2.3	1.24
COTX09052-2Ru	WR	3.4	3.3	3.4	3.6	1.66
OR05039-4	WR	1.0	1.0	3.8	3.8	1.86
POR06V12-3	WR	2.9	3.4	4.0	3.0	1.78
TX08352-5Ru	WR	2.6	3.0	4.1	3.5	1.65
CO07015-4RU	SWR	3.0	3.8	3.8	3.3	1.72
CO07049-1RU	SWR	3.1	3.8	3.9	3.6	1.68
Mean		**2.5**	**2.8**	**3.8**	**3.2**	**1.71**
95% CI		**0.4**	**0.6**	**NS**	**0.4**	**0.09**

[1] 1=Worst, 5=Best - Fresh Market Russet Merit Score takes into account multiple factors including: tuber shape, eye depth, russeting, and shape uniformity

[2] 1=Light, 5=Heavy

[3] 1=Deep, 5=Shallow

[4] 1=Round, 5=Oblong

[5] 1= Non Uniform, 5=Very Uniform

[6] Ratio of 10 tubers measured from each plot, 8-16 oz in size.

Table 3. Tuber Defects of Experimental and Standard Russet Skinned Potato Entries.

Clone/Variety	Trial	Hollow Heart[1] (%)	Stem End Bruise[1] (%)	Internal Brown Spot[1] (%)	Hard Bite[1] (%)	Knobs[2] (%)	Growth Crack[2] (%)	Irregular Shaped[2] (%)	Green[2] (%)
Ranger Russet	WR	0	4	0.0	0.0	0.9	0.5	2.2	0.6
Russet Burbank	WR	0	2	0.0	0.0	0.8	2.3	3.0	0.1
Russet Norkotah	WR	23	1	0.0	0.0	3.4	0.2	3.5	0.9
A03141-6	WR	0	4	0.5	0.0	5.4	1.1	6.9	1.8
A03921-2	WR	0	4	0.8	0.0	5.0	0.9	3.4	7.5
A06021-1T	WR	8	2	0.0	0.0	0.5	0.2	1.8	2.7
A06084-1TE	WR	0	8	0.0	0.0	12.3	0.0	3.4	0.8
A06862-18VR	WR	0	2	0.3	0.5	2.0	2.8	3.5	2.5
A06914-3CR	WR	0	4	0.0	0.0	2.6	0.7	3.6	0.8
AC05039-2RU	WR	0	3	0.0	0.0	0.0	0.1	2.5	2.6
AO03123-2	WR	0	2	0.0	0.0	1.8	0.8	2.5	2.0
AOR06070-1KF	WR	10	1	0.0	0.0	1.0	1.0	4.6	2.5
CO05068-1RU	WR	3	2	0.0	0.0	0.2	0.1	2.2	1.0
CO05175-1RU	WR	15	1	0.0	0.8	3.1	0.1	5.8	1.5
COTX09022-3RuRE/Y	WR	3	2	0.0	0.3	0.4	10.9	1.3	0.3
COTX09052-2Ru	WR	0	3	0.0	0.0	0.2	0.1	1.9	2.3
OR05039-4	WR	0	3	0.0	0.0	0.4	0.4	1.9	0.8
POR06V12-3	WR	0	1	0.0	0.0	5.9	0.0	2.9	2.2
TX08352-5Ru	WR	0	1	0.0	0.0	1.9	0.2	2.5	0.0
CO07015-4RU	SWR	0	1	0.0	0.0	0.1	0.3	1.2	0.2
CO07049-1RU	SWR	3	3	0.0	0.0	0.8	1.5	2.4	0.5
Mean		**3.0**	**2.3**	**0.1**	**0.1**	**2.3**	**1.2**	**3.0**	**1.6**
95% CI		**1.0**	**1.0**	**0.3**	**0.3**	**1.5**	**1.0**	**1.6**	**1.0**

[1] 10, 8-16oz. tubers were evaluated from each plot.

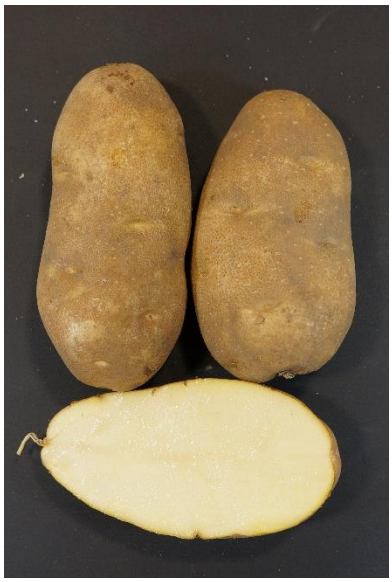
[2] Percent of total tubers.

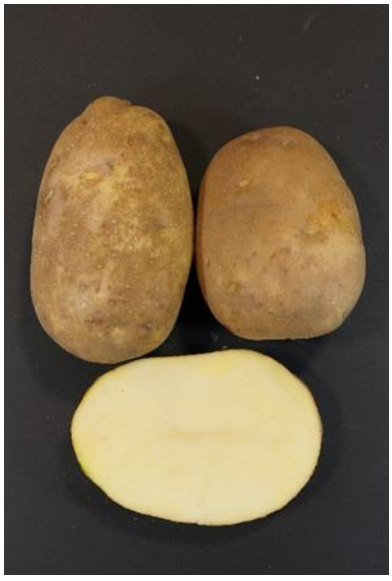
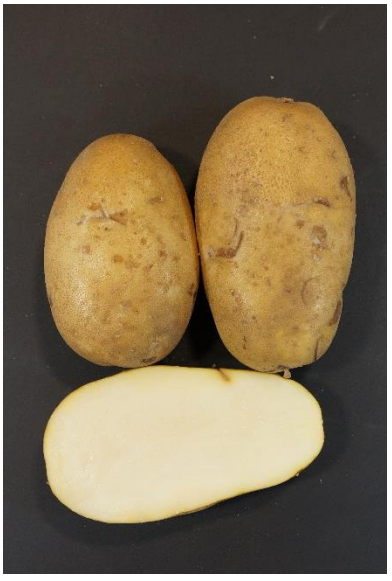
Table 4. Disease Susceptibility, Stand, Tuber Set, Average Tuber Size and Specific Gravity of Experimental and Standard Russet Skinned Potato Entries.

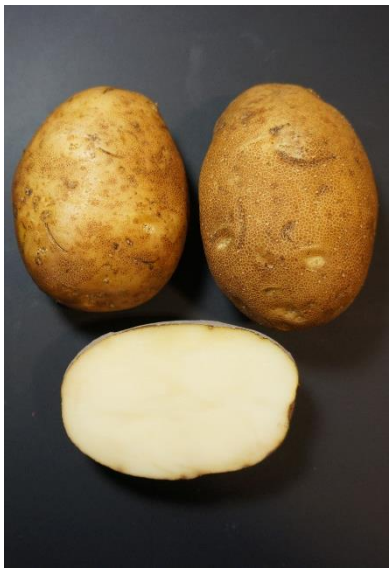
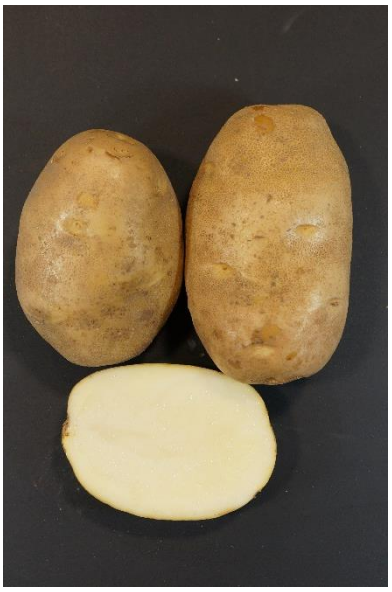
Clone/Variety	Trial	Early Dying A.U.D.P.C.[1]	% Stand	Tubers/Plant	Avg. Tuber Size (oz.)	Specific Gravity
Ranger Russet	WR	655	100	7.2	6.2	1.088
Russet Burbank	WR	739	100	6.4	6.0	1.085
Russet Norkotah	WR	1313	100	5.1	7.3	1.068
A03141-6	WR	478	100	4.6	10.0	1.090
A03921-2	WR	806	100	6.6	6.4	1.098
A06021-1T	WR	801	100	5.7	6.8	1.090
A06084-1TE	WR	504	100	6.2	6.2	1.085
A06862-18VR	WR	520	100	5.8	7.1	1.093
A06914-3CR	WR	766	100	6.4	6.7	1.085
AC05039-2RU	WR	1093	100	6.0	5.2	1.085
AO03123-2	WR	504	100	5.7	5.7	1.083
AOR06070-1KF	WR	501	100	5.8	7.2	1.098
CO05068-1RU	WR	521	100	6.6	6.5	1.098
CO05175-1RU	WR	579	100	5.0	7.2	1.080
COTX09022-3RuRE/Y	WR	774	100	5.3	5.5	1.083
COTX09052-2Ru	WR	957	100	7.5	5.2	1.085
OR05039-4	WR	629	100	5.6	6.3	1.085
POR06V12-3	WR	601	100	7.4	5.4	1.090
TX08352-5Ru	WR	1583	100	5.3	5.2	1.068
CO07015-4RU	SWR	1304	100	6.9	5.1	1.075
CO07049-1RU	SWR	759	100	6.5	6.3	1.080
Mean		**780**	**100**	**6.1**	**6.4**	**1.085**
95% CI		**172**	**NS**	**0.5**	**0.4**	**0.005**

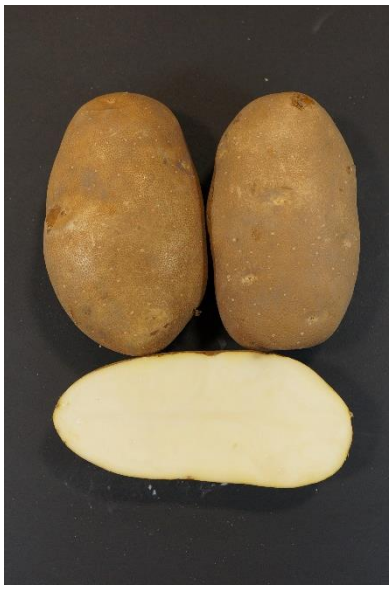
[1] Area Under Disease Progress Curve based on foliar early-dying ratings taken 82, 88, 97, and 102 days after planting. Higher value is more susceptible.

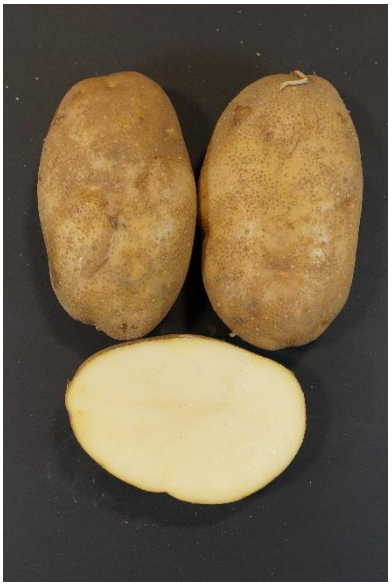
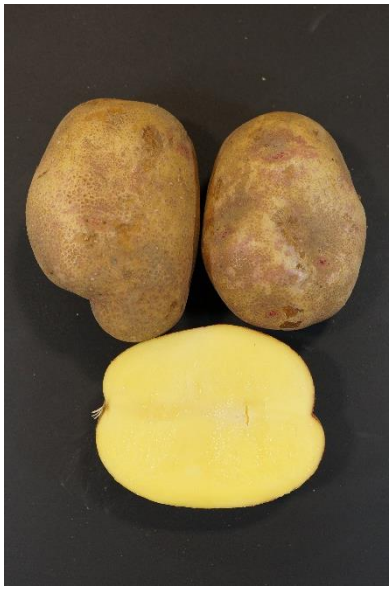
Figure 1. 2015 Late Russet Trial Entries.

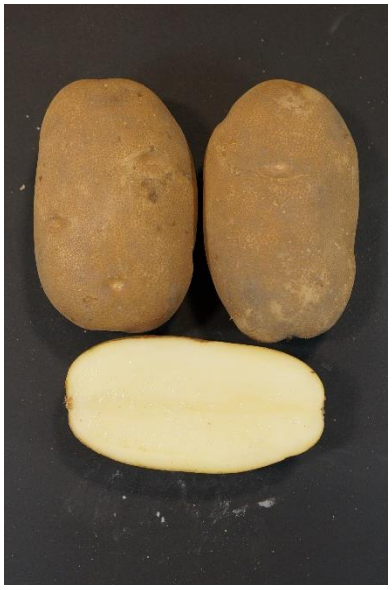
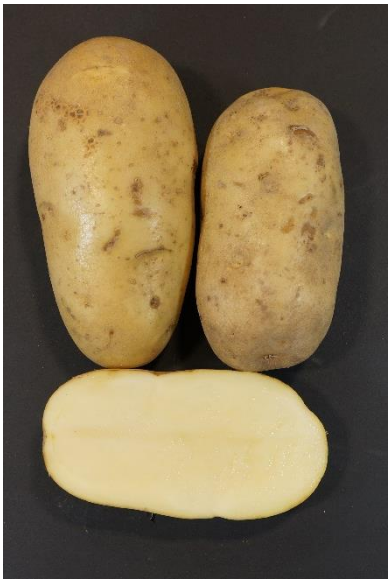
Ranger Russet (WR)	Russet Burbank (WR)	Russet Norkotah (WR)
		
• Uniformly lumpy		• High incidence of hollow heart (23%)

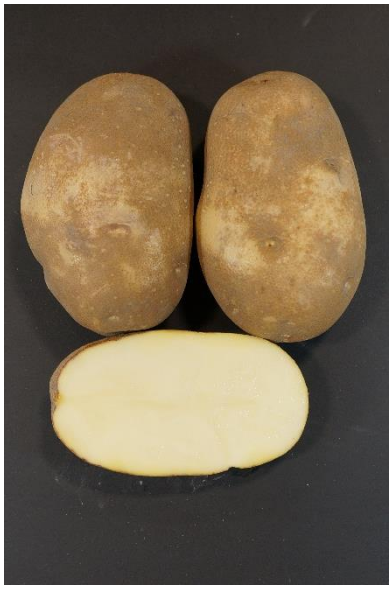
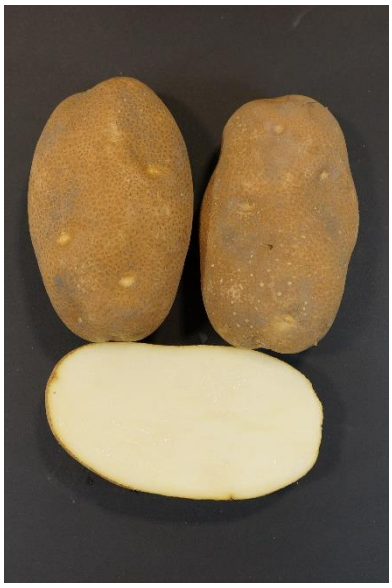
A03141-6 (WR)	A03921-2 (WR)	A06021-1T (WR)
		
• Resistant to early-dying • Large average tuber size	• Very light russet • Uniformly lumpy	• Susceptible to lenticel scarring

A06084-1TE (WR)	A06862-18VR (WR)	A06914-3CR (WR)
		
• Oblong shape • High incidence of knobs (12.3%)	• Round shape	• Very light russeting

AC05039-2RU (WR)	AO03123-2 (WR)	AOR06070-1KF (WR)
		
• Curved shape		

CO05068-1RU (WR)	CO05175-1RU (WR)	COTX09022-3RuRE/Y (WR)
		
• Light russeting • Pink eyes	• Blocky shape	• Pink eyes • Round shape • Yellow flesh

COTX09052-2Ru (WR)	OR05039-4 (WR)	POR06V12-3 (WR)
		
• Blocky shape • High merit score	• No russeting • High incidence of lenticel scarring	

TX08352-5Ru (WR)	CO07015-4RU (SWR)	CO07049-1RU (SWR)
		
• Uniformly lumpy	• Uniformly lumpy • Susceptible to lenticel scarring	• Flat shape • Susceptible to lenticel scarring

Red/Specialty Variety Trial

The Red/Specialty Trial included 17 entries from the Western Regional Variety Trial (WR) and six entries from the Southwest Regional Trial (SWR). Red and specialty type potatoes are an expanding segment of the Klamath Basin potato industry. Organic certified acreage is also increasing in these categories. Important vine and tuber characteristics for fresh market red/specialty types include: skin and flesh color, fresh merit score, tuber shape, tuber uniformity, tubers per plant, and average tuber size. See Tables 5-10 for Red/Specialty trial results and Figure 2 for entry pictures and comments.

Trial Information

Location:	Intermountain Research and Extension Center, Tulelake, CA
Soil Type:	Tulebasin mucky silty clay loam
Planting Date:	May 14th 2015
Vine Kill Date:	September 2nd
Days to Vine Kill:	111
Harvest Date:	October 1st 2015
Irrigation:	Solid-set sprinklers; applied water + precipitation = 24.66 inches
Plot Length:	18.3 Ft
In-Row Spacing:	10 Inches
Row Spacing:	36 Inch
Number of Reps:	4
# of Fertilizer/Acre:	205 N, 104 P205, 100 K, 36 S
Seed Treatment:	Maxim 4FS and Fir Bark Dust
Weed Control:	Roundup PowerMax, Prowl H2O, and Outlook (pre-emergence)
	Matrix (early post-emergence)
Insecticides:	Admire Pro (in-furrow) and Vydate
Fungicides:	Quadris (in-furrow) and foliar late blight fungicide program
Vine Kill Method:	Rolling and Reglone at labeled rates

Results

Potato Stand

- Lowest: CO05035-1PW/Y (86%), CO05037-3W/Y (86%), CO07102-1R (89%)
- Highest: All other entries were above 90%

Tuber Count and Size

- **Tubers Per Plant**
  Highest: CO05037-3W/Y (12.1), COTX03134-1W (11.3), A05182-7Y (11.2)
  Lowest: ATTX98514-1R/Y (5.9), Yukon Gold (6.0)

- **Average Tuber Size (oz.)**
  Largest: TXWL-1 (7.5), Yukon Gold (7.3), Red LaSoda (7.1)
  Smallest: COTX03134-1W (2.7)

Yield

- **Total Yield (cwt/A)**
  Highest: NDA081451CB-1CY (624), Chieftan (611), Red LaSoda (603)
  Lowest: CO05037-2R/Y (283), COTX03134-1W (327)

- **4-10 oz Yield (cwt/A)**
  Highest: NDA081451CB-1CY (362), ATX05202S-3W/Y (350)
  Lowest: COTX03134-1W (67), CO05037-2R/Y (101)

- **Undersized Tubers- <4 oz. (cwt/A)**
  Most: COTX03134-1W (246), CO05037-3W/Y (184)
  Least: Yukon Gold (38), ATTX98514-1R/Y (40)

Tuber Defects

- **Hollow Heart**
  Notable Entries: Yukon Gold (8%), Red LaSoda (5%)

- **Vascular Discoloration**
  Notable Entries: Yukon Gold (68%), CO05037-2R/Y (50%)

- **Growth Cracks**
  Notable Entries: Red LaSoda (11%)

Early Dying Susceptibility

- **Area Under the Disease Progress Curve**
  Most Susceptible: AC05175-3P/Y (991), CO05037-3W/Y (671)
  Least Susceptible: NDA050237B-1R (65), CO04021-2R/Y (65), A05182-7Y (68)

Table 5. Skin and Flesh Characteristics of Specialty Entries.

Clone/Variety	Trial	Skin Color	Skin Darkness[1]	Flesh Color	Flesh Darkness[1]
Chieftan	WR	Red	2.3	White	1.0
Red LaSoda	WR	Red	2.0	White	1.5
NDA050237B-1R	WR	Red	2.5	White	1.0
A05180-3PY	WR	Purple	4.1	Yellow	3.3
AC05175-3P/Y	WR	Purple	4.6	Yellow	3.4
ATTX98514-1R/Y	WR	Red	2.1	Yellow	2.5
CO04021-2R/Y	WR	Red	3.1	Yellow	3.5
CO05035-1PW/Y	WR	Purple/White	3.0	Yellow	3.0
CO05037-2R/Y	WR	Red	2.6	Yellow	3.8
COA07365-4RY	WR	Red	3.3	Yellow	2.6
Yukon Gold	WR	White	1.3	Yellow	3.0
A05182-7Y	WR	Yellow	1.4	Yellow	2.9
ATX05202s-3W/Y	WR	White	1.0	Yellow	2.6
CO05037-3W/Y	WR	White	1.5	Yellow	3.8
COTX03134-1W	WR	White	1.0	White	1.3
NDA081451CB-1CY	WR	Yellow	1.0	Yellow	3.3
TXWL-1	WR	White	1.4	White	2.0
CO07370-1W/Y	SWR	White	1.3	Yellow	3.6
CO07102-1R	SWR	Red	2.8	White	0.8
Mean			**2.2**		**2.6**
95% CI			**0.2**		**0.4**

[1]1=Light, 5=Dark; Reds and purples were rated using red/purple color scale. Yellows were rated using a white/yellow color scale. All varieties were rated using the same internal flesh darkness scale.

Table 6. Tuber Yield and Size of Experimental and Standard Specialty Potato Entries.

Clone/Variety	Skin Color	Tuber Yield (cwt/A) >14oz	10-14oz	6-10oz	4-6oz	<4oz	Culls	Total Yield
Chieftan	Red	109	108	149	95	81	70	611
Red LaSoda	Red	44	87	174	69	63	165	603
NDA050237B-1R	Red	14	59	193	140	90	9	506
A05180-3PY	Purple	33	74	184	102	87	93	573
AC05175-3P/Y	Purple	0	11	130	143	133	7	424
ATTX98514-1R/Y	Red	32	83	132	61	40	65	413
CO04021-2R/Y	Red	10	46	204	135	94	34	524
CO05035-1PW/Y	Purple/White	76	97	177	85	55	13	503
CO05037-2R/Y	Red	0	0	16	85	177	5	283
COA07365-4RY	Red	0	4	60	107	150	23	343
Yukon Gold	White	78	92	142	65	38	20	435
A05182-7Y	Yellow	1	11	113	153	177	8	464
ATX05202s-3W/Y	White	11	73	217	133	88	47	569
CO05037-3W/Y	White	1	12	98	128	184	10	433
COTX03134-1W	White	0	0	11	56	246	14	327
NDA081451CB-1CY	Yellow	9	80	227	134	110	62	624
TXWL-1	White	73	119	164	61	45	116	578
CO07370-1W/Y	White	1	4	68	99	143	32	348
CO07102-1R	Red	7	42	177	132	109	53	520
Mean		**26**	**53**	**139**	**104**	**111**	**45**	**478**
95% CI		**12**	**18**	**28**	**15**	**13**	**16**	**88**

Table 7. Tuber Size Distribution of Experimental and Standard Specialty Potato Entries.

		% Of Total Tubers					
Clone/Variety	**Skin Color**	**>14oz**	**10-14oz**	**6-10oz**	**4-6oz**	**<4oz**	**Culls**
Chieftan	Red	6	11	23	22	33	6
Red LaSoda	Red	3	9	27	17	27	17
NDA050237B-1R	Red	1	6	27	30	34	2
A05180-3PY	Purple	2	7	25	23	32	10
AC05175-3P/Y	Purple	0	1	18	30	49	2
ATTX98514-1R/Y	Red	3	12	29	21	24	11
CO04021-2R/Y	Red	1	4	28	28	33	6
CO05035-1PW/Y	Purple/White	6	11	30	23	26	4
CO05037-2R/Y	Red	0	0	3	21	75	1
COA07365-4RY	Red	0	0	9	24	62	4
Yukon Gold	White	8	13	31	22	23	3
A05182-7Y	Yellow	0	1	14	28	56	2
ATX05202s-3W/Y	White	1	6	28	27	30	8
CO05037-3W/Y	White	0	1	12	23	61	2
COTX03134-1W	White	0	0	2	10	85	3
NDA081451CB-1CY	Yellow	1	6	27	24	34	9
TXWL-1	White	6	13	27	16	21	16
CO07370-1W/Y	White	0	0	10	22	58	9
CO07102-1R	Red	0	4	23	26	38	8
Mean		**2**	**6**	**21**	**23**	**42**	**7**
95% CI		**1**	**2**	**3**	**3**	**5**	**2**

Table 8. External Tuber Characteristics of Experimental and Standard Specialty Potato Entries.

Clone/Variety	Skin Color	Merit Score[1]	Eye Depth[2]	Tuber Shape[3]	Shape Uniformity[4]	Length/ Width Ratio[5]
Chieftan	Red	3.3	3.0	3.1	3.4	1.23
Red LaSoda	Red	2.8	2.4	3.0	3.9	1.14
NDA050237B-1R	Red	3.4	3.1	2.4	3.9	1.03
A05180-3PY	Purple	3.0	3.1	2.8	4.0	1.01
AC05175-3P/Y	Purple	3.1	2.8	2.8	3.9	1.06
ATTX98514-1R/Y	Red	2.5	3.8	3.3	3.4	1.17
CO04021-2R/Y	Red	2.8	3.6	3.3	2.8	1.32
CO05035-1PW/Y	Purple/White	3.0	3.9	3.5	3.6	1.32
CO05037-2R/Y	Red	2.6	3.4	4.8	4.3	1.98
COA07365-4RY	Red	3.3	3.5	2.6	3.9	1.03
Yukon Gold	White	3.1	3.6	3.0	3.6	1.13
A05182-7Y	Yellow	3.6	3.4	2.8	3.9	1.05
ATX05202s-3W/Y	White	3.4	3.9	2.8	3.6	1.09
CO05037-3W/Y	White	3.0	3.8	3.0	3.6	1.14
COTX03134-1W	White	2.0	3.0	4.4	3.9	1.72
NDA081451CB-1CY	Yellow	3.5	3.9	2.5	4.0	1.13
TXWL-1	White	2.3	1.6	3.0	3.8	1.09
CO07370-1W/Y	White	2.8	3.6	2.9	3.1	1.00
CO07102-1R	Red	2.6	3.5	2.9	3.9	1.30
Mean		**2.9**	**3.3**	**3.1**	**3.7**	**1.21**
95% CI		**0.3**	**0.5**	**0.3**	**0.4**	**0.08**

[1] 1=Worst, 5=Best - Specialty Merit Score takes into account multiple factors important to the Specialty market including tuber shape, eye depth, and shape uniformity

[2] 1=Deep, 5=Shallow

[3] 1=Round, 5=Oblong

[4] 1= No Uniformity, 5=Very Uniform

[5] Ratio of 10 tubers measured from each plot

Table 9. Tuber Defects of Experimental and Standard Specialty Potato Entries.

Clone/Variety	Skin Color	Hollow Heart[1] (%)	Black Spot Bruise[1] (%)	Vascular Discoloration[1] (%)	Knobs[2] (%)	Growth Cracks[2] (%)	Irregular Shape[2] (%)	Green[2] (%)	Total Cull[2] (%)
Chieftan	Red	0	0	28	0.9	3.4	1.1	0.4	6
Red LaSoda	Red	5	0	23	2.1	11.0	1.1	2.7	17
NDA050237B-1R	Red	0	0	28	0.1	0.8	0.1	1.1	2
A05180-3PY	Purple	3	0	38	0.7	7.6	0.6	1.5	10
AC05175-3P/Y	Purple	3	3	13	0.2	0.0	0.4	1.1	2
ATTX98514-1R/Y	Red	0	3	15	0.6	7.3	1.6	1.2	11
CO04021-2R/Y	Red	0	0	28	0.7	0.3	2.9	2.1	6
CO05035-1PW/Y	P/W	3	0	25	0.1	0.2	1.5	2.3	4
CO05037-2R/Y	Red	0	0	50	0.0	0.0	0.7	0.8	1
COA07365-4RY	Red	0	3	20	0.1	1.0	2.3	0.6	4
Yukon Gold	White	8	0	68	0.3	0.8	1.4	0.6	3
A05182-7Y	Yellow	0	0	8	0.2	0.1	0.5	1.2	2
ATX05202s-3W/Y	White	0	0	10	0.9	2.7	0.6	3.9	8
CO05037-3W/Y	White	0	0	10	0.4	0.0	0.3	1.7	2
COTX03134-1W	White	3	0	38	0.3	0.7	0.9	1.5	3
NDA081451CB-1CY	Yellow	3	0	13	0.3	2.1	0.6	6.3	9
TXWL-1	White	0	0	18	0.6	7.2	1.0	7.6	16
CO07370-1W/Y	White	0	0	30	0.5	1.4	3.0	4.1	9
CO07102-1R	Red	0	3	28	3.2	1.3	1.6	1.7	8
Mean		**1**	**1**	**26**	**1.1**	**2.5**	**1.2**	**2.2**	**7**
95% CI		**NS**	**NS**	**16**	**1.0**	**1.5**	**NS**	**0.9**	**2**

[1] 10, 6-10oz. tubers were evaluated from each plot.

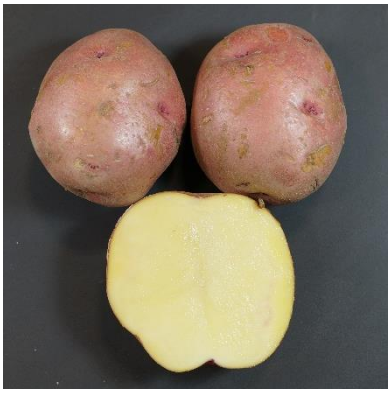
[2] Percent of total tubers.

Table 10. Disease Susceptibility, Stand, Tuber Set, Average Tuber Size and Specific Gravity of Experimental and Standard Specialty Potato Entries.

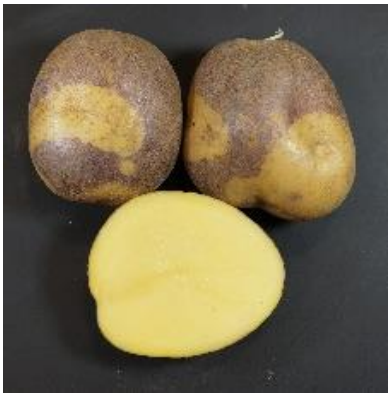
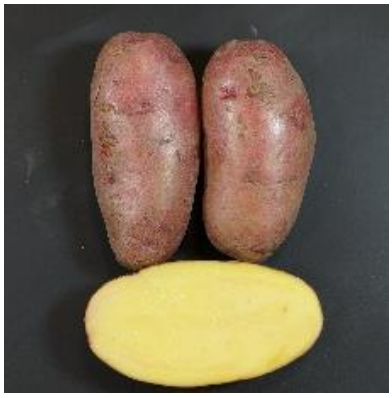
Clone/Variety	Skin Color	Early Die Rating[1]	% Stand	Tubers/Plant	Avg. Tuber Size (oz.)	Specific Gravity
Chieftan	Red	210	93	8.7	7.0	1.068
Red LaSoda	Red	146	98	7.9	7.1	1.073
NDA050237B-1R	Red	65	99	8.8	5.3	1.064
A05180-3PY	Purple	298	99	8.8	6.1	1.073
AC05175-3P/Y	Purple	991	95	9.7	4.2	1.059
ATTX98514-1R/Y	Red	339	93	5.9	6.9	1.064
CO04021-2R/Y	Red	65	93	9.9	5.2	1.072
CO05035-1PW/Y	Purple/White	120	86	8.3	6.5	1.073
CO05037-2R/Y	Red	472	99	8.4	3.1	1.083
COA07365-4RY	Red	143	97	8.7	3.8	1.065
Yukon Gold	White	505	91	6.0	7.3	1.076
A05182-7Y	Yellow	68	96	11.2	3.9	1.079
ATX05202s-3W/Y	White	86	91	10.4	5.6	1.076
CO05037-3W/Y	White	671	86	12.1	3.8	1.068
COTX03134-1W	White	168	98	11.3	2.7	1.078
NDA081451CB-1CY	Yellow	106	97	10.7	5.5	1.086
TXWL-1	White	182	98	7.2	7.5	1.074
CO07370-1W/Y	White	92	94	9.0	3.8	1.075
CO07102-1R	Red	578	89	10.6	5.1	1.077
Mean		**279**	**94**	**9.1**	**5.3**	**1.073**
95% CI		**126**	**5**	**0.7**	**0.4**	**0.004**

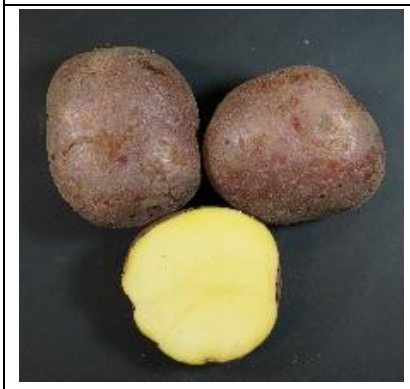
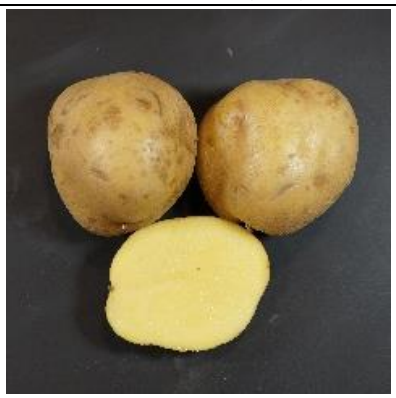
[1] Area Under Disease Progress Curve based on foliar early-dying ratings taken 82, 88, 97, and 102 days after planting. Higher value is more susceptible.

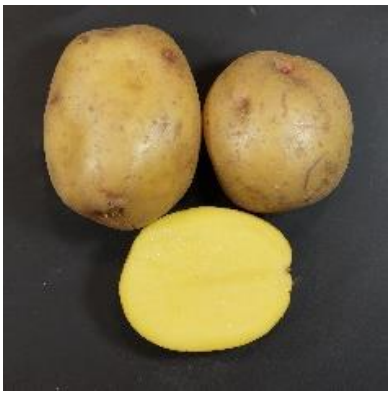
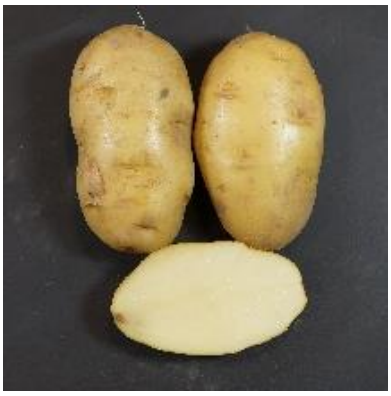
Figure 2. 2015 Red/ Specialty Trial Entries.

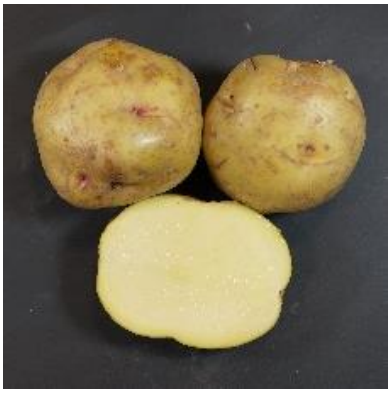
Chieftan (WR)	Red Lasoda (WR)	NDA050237B-1R (WR)
		
		• Best looking red • Deep red color • Glossy skin after polishing • Few external blemishes

A05180-3PY (WR)	AC05175-3P/Y (WR)	ATTX98514-1R/Y (WR)
		
	• Very dark purple	• Flat shape

CO04021-2R/Y (WR)	CO05035-1PW/Y (WR)	CO05037-2R/Y (WR)
		
• More russeting than standards		• Nice shape uniformity • Pink Vascular veins

COA07365-4RY (WR)	Yukon Gold (WR)	A05182-7Y (WR)
		
• Dark red • Susceptible to shatter	• Industry standard	• Shiny skin • Darker pink eyes than Yukon Gold

ATX05202S-3W/Y (WR)	CO05037-3W/Y (WR)	COTX03134-1W (WR)
		
• Lots of common scab	• Flat shape • High shape uniformity (4.3)	• Uniformly lumpy • Lots of eyes

NDA081451CB-1CY (WR)	TXWL-1 (WR)	CO07370-1W/Y (SWR)
		
• Glossy skin • High yield (624 cwt/A)	• Uniformly lumpy • Spreading pink eyes	• Pear shape

CO07102-1R (SWR)

• Poor turgor at harvest

Chipping Potato Variety Trial

In recent years, expanding markets have created a need for public chip varieties. The 2015 Chipping Trial included seven entries from the Western Regional Variety Trial (WR) and two entries from the South West Region (SWR). Important characteristics for processing chippers include: total yield, tubers per plant, tuber shape, tuber uniformity, average tuber size, and specific gravity. See Tables 11-14 for Chipping Trial results and Figure 3 for entry pictures and comments.

Trial Information

Location:	Intermountain Research and Extension Center, Tulelake, CA
Soil Type:	Tulebasin mucky silty clay loam
Planting Date:	May 14th 2015
Vine Kill Date:	September 2nd
Days to Vine Kill:	111
Harvest Date:	October 1st 2015
Irrigation:	Solid-set sprinklers; applied water + precipitation = 24.14 inches
Plot Length:	18.3 feet
In-Row Spacing:	10 inches
Row Spacing:	36 inches
Number of Reps:	4
# of Fertilizer/Acre:	204.6 N, 104 P205, 100 K, 36 S
Seed Treatment:	Maxim 4FS and Fir Bark Dust
Weed Control:	Roundup PowerMax, Prowl H2O, and Outlook (pre-emergence)
	Matrix (Early post-emergence)
Insecticides:	Admire Pro (in furrow) and Vydate
Fungicides:	Quadris and foliar late blight fungicide program
Vine Kill Method:	Rolling and with labeled rates of Reglone

Results

Stand Counts

Highest: Atlantic (99%), Snowden (98%), OR09256-2 (98%)
Lowest: AC03433-1W (84%), CO07070-13W (91%)

Tuber Count and Size

- **Tubers per Plant**
  Highest: CO07070-13W (10.4), Snowden (8.7), OR09256-2 (8.7)
  Lowest: AC00206-2W (7.0), Atlantic (7.3)

- **Average Tuber Size (oz.)**
  Largest: AC03452-2W (6.8), AC03433-1W (6.7)
  Smallest: CO07070-10W (4.0), CO07070-13W (4.6)

Yield

- **Total Yield (cwt/A)**
  Highest: AC03452-2W (547), Atlantic (495)
  Lowest: CO07070-10W (319), AC05153-1W (392)

- **4-14 oz. (cwt/A)**
  Highest: AC03452-2W (417), Snowden (351)
  Lowest: CO07070-10W (178), CO07070-13W (321), AC03433-1W (321)

- **Undersized Tubers- <4 oz. (cwt/A)**
  Most: CO07070-10W (133), CO07070-13W (132)
  Least: AC03433-1W (45), AC03452-2W (51)

Specific Gravity

Highest: CO07070-10W (1.108), Atlantic (1.095)
Lowest: AC03452-2W (1.073), AC03433-1W (1.081)

Tuber Defect Incidence

- **Hollow Heart**
  Notable Entries: AC03433-1W (48%)

Early Dying Susceptibility

- **Area Under the Disease Progress Curve (higher value is more susceptible)**
  Most Susceptible: CO07070-13W (744), AC05153-1W (547)
  Least Susceptible: AC03433-1W (61), AC03452-2W (119)

Table 11. Tuber Yield and Size of Experimental and Standard Chipping Potato Entries.

		Tuber Yield (cwt/A)						
Clone/Variety	Trial	>14oz	10-14oz	6-10oz	4-6oz	<4oz	Culls	Total Yield
Atlantic	WR	55	80	171	97	67	25	495
Snowden	WR	3	35	160	155	102	12	468
AC00206-2W	WR	26	89	159	87	57	42	460
AC03433-1W	WR	38	85	156	80	45	53	456
AC03452-2W	WR	49	98	219	100	51	30	547
AC05153-1W	WR	18	30	125	109	102	10	392
OR09256-2	WR	3	24	155	158	104	15	459
CO07070-10W	SWR	2	11	72	96	133	6	319
CO07070-13W	SWR	2	17	158	147	132	16	471
Mean		**21**	**52**	**153**	**114**	**88**	**23**	**452**
95% CI		**12**	**19**	**26**	**16**	**10**	**9**	**39**

Table 12. Fresh Merit Score and Tuber Characteristics of Experimental and Standard Chipping Potato Entries.

Clone/Variety	Trial	Merit Score[1]	Eye Depth[2]	Shape Uniformity[4]	Length/ Width Ratio[5]
Atlantic	WR	3.5	3.5	3.6	1.00
Snowden	WR	3.8	3.1	3.5	0.93
AC00206-2W	WR	3.6	3.6	3.8	1.00
AC03433-1W	WR	3.4	3.1	3.6	0.93
AC03452-2W	WR	3.9	2.9	3.6	0.99
AC05153-1W	WR	3.2	3.3	3.5	0.97
OR09256-2	WR	3.8	3.5	3.6	1.07
CO07070-10W	SWR	3.8	3.6	4.0	1.09
CO07070-13W	SWR	3.6	3.8	3.6	0.94
Mean		**3.6**	**3.4**	**3.7**	**0.5**
95% CI		**0.3**	**0.4**	**0.5**	**0.4**

[1] 1=Worst, 5=Best - Chipper Merit Score takes into account multiple factors including: tuber shape, eye depth, and shape uniformity
[2] 1=Deep, 5=Shallow
[3] 1=Round, 5=Oblong
[4] 1= No Uniformity, 5=Very Uniform
[5] Ratio of 10 tubers measured from each plot

Table 13. Tuber Defects of Experimental and Standard Chipping Potato Entries.

Clone/Variety	Trial	Hollow Heart[1] (%)	Black Spot Bruise[1] (%)	Stem End Bruising[1] (%)	Knobs[2] (%)	Growth Cracks[2] (%)	Green[2] (%)
Atlantic	WR	0	0	10	0.3	0.1	4.6
Snowden	WR	0	0	18	0.1	2.3	2.3
AC00206-2W	WR	5	0	20	0.1	2.5	4.8
AC03433-1W	WR	48	0	10	0.1	1.6	5.7
AC03452-2W	WR	0	0	10	1.2	2.2	2.2
AC05153-1W	WR	0	0	13	0.0	1.8	1.4
OR09256-2	WR	3	0	18	0.3	1.2	1.7
CO07070-10W	SWR	0	3	15	0.2	2.9	1.6
CO07070-13W	SWR	0	3	15	0.0	0.6	2.4
Mean		**6**	**1**	**14**	**0.2**	**1.6**	**3.0**
95% CI		**4**	**NS**	**NS**	**0.4**	**1.2**	**1.3**

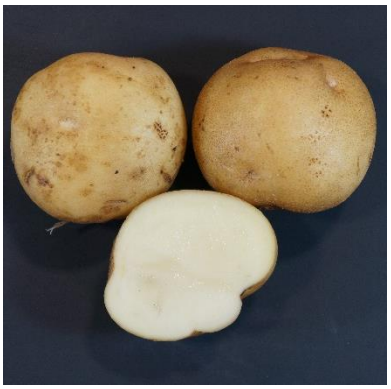
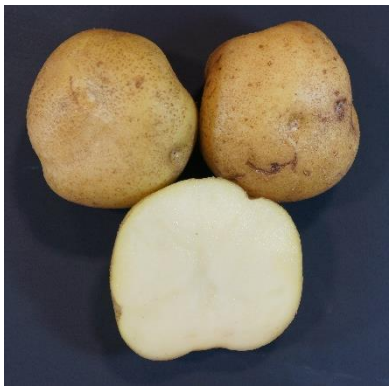
[1] 10, 6-10oz tubers were evaluated from each plot.
[2] Percent of total tubers.

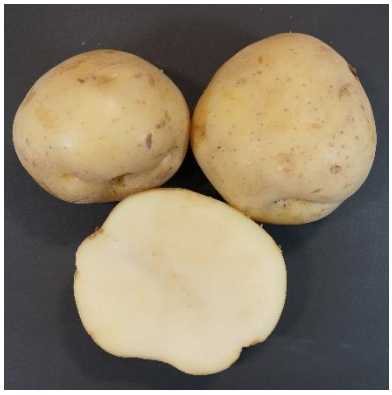
Table 14. Disease Susceptibility, Stand, Tuber Set, Average Tuber Size and Specific Gravity of Experimental and Standard Chipping Potato Entries.

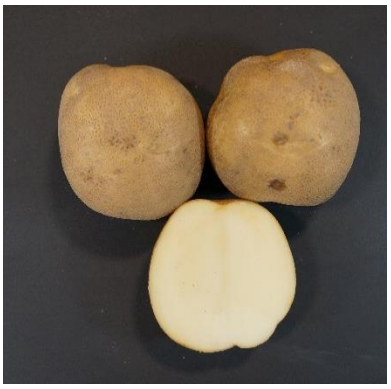
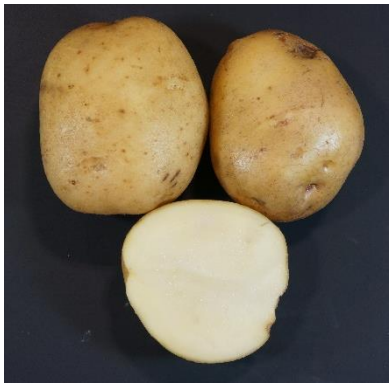
Clone/Variety	Trial	Early Die Rating A.U.D.P.C.[1]	% Stand	Tubers/Plant	Avg. Tuber Size (oz.)	Specific Gravity
Atlantic	WR	324	99	7.3	7.3	1.095
Snowden	WR	174	98	8.7	8.7	1.091
AC00206-2W	WR	308	96	7.0	7.0	1.087
AC03433-1W	WR	61	84	7.5	7.5	1.081
AC03452-2W	WR	119	95	7.8	7.8	1.073
AC05153-1W	WR	547	95	7.8	7.8	1.085
OR09256-2	WR	341	98	8.7	8.7	1.093
CO07070-10W	SWR	361	94	7.8	7.8	1.108
CO07070-13W	SWR	744	91	10.4	10.4	1.092
Mean		**327**	**95**	**8.1**	**5.5**	**1.089**
95% CI		**136**	**3**	**0.6**	**0.3**	**-**

[1] Area Under Disease Progress Curve based on foliar early-dying ratings taken 82, 88, 97, and 102 days after planting. Higher value is more susceptible.

Figure 3. 2015 Chipper Trial Entries.

Atlantic (WR)	Snowden (WR)	AC00206-2W (WR)
		

AC03433-1W (WR)	AC03452-2W (WR)	AC05153-1W (WR)
		
• High hollow heart (48%)	• High yield (547 cwt/A) • High merit score (3.9)	

OR09256-2 (WR)	CO07070-10W (SWR)	CO07070-13W (SWR)
		

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