

## Selected Red/Yellow Skin Varieties Appearance and Quality After Storage, Washing and Polishing

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### **Introduction:**

Red and specialty type potatoes are an expanding segment of the Klamath Basin potato industry. Red and yellow skin potatoes are increasing in popularity with consumers, and growers are always looking for new varieties to fill a niche or match industry preferences. IREC has evaluated red, yellow, and specialty potatoes in variety tests for more than 20 years, and we've collected a lot of information on agronomic traits at harvest. However, little information is collected on the varieties appearance and quality after storage and commercial washing and polishing. This study examined external appearance of multiple red- and yellow-skinned varieties following storage and commercial polishing to identify varieties resistant to skinning and external blemishes.

### **Trial Information**

<b>Location:</b>	IREC, Tulelake, CA
<b>Soil Type:</b>	Tulebasin mucky silty clay loam
<b>Planting Date:</b>	May 21, 2014
<b>Harvest Date:</b>	September 29, 2014
<b>Harvest Pulp Temperature:</b>	56 °F
<b>Irrigation:</b>	Solid-set sprinklers
<b>Plot Size:</b>	2 rows (6 ft) wide by 30 ft long
<b>In-Row Seed Spacing:</b>	10 inches
<b>Number of Replications:</b>	4
<b>Fertilizer per Acre:</b>	204N-40P205-110K20-34S
<b>Seed Treatment:</b>	Agri-Fill Premium Fir Bark Dust, Maxim 4FS
<b>Weed Control:</b>	Prowl H <sub>2</sub> O & Outlook (pre-emergence), Outlook (post)
<b>Insecticides:</b>	Admire Pro (in-furrow)

<b>Fungicides:</b>	Quadris (in-furrow)
	Omega F500
	Quadris
	Bravo Weatherstik
<b>Vine Kill Method:</b>	Rolling vine
	Two applications of Reglone spaced 7 days apart

## **Methods**

Plots were harvested by laying potatoes up on top of the beds with a John Deere two-row potato lifter. A fifty pound sub-sample was randomly collected by hand in the field, and then put into climate-controlled storage at 44°F. A 10 tuber sample was pulled 15 days after harvest for internal/external evaluations. The remaining sample was stored for 77 days after harvest, washed, allowed to warm at 65°F for 24 hours, and then polished using commercial equipment. 10 tuber sub-samples of washed and polished tubers were evaluated separately one day after polishing. Polished tubers were evaluated again 25 days after polishing to determine if polish tumbling caused bruising or other problems that may not be evident immediately. Analysis of Variance was not possible on all polishing data due to lack of replication and time constraints of commercial equipment at a local packing facility.

## **Results**

Varieties differed in their appearance, uniformity, and external defects at harvest (Table 1). Modoc had a high amount of shatter compared to most other varieties in the trial. Chieftan had a noticeably lighter skin color than Sierra Rose, NDTX5438-11R, and Modoc. Jacqueline Lee had a significantly longer shape than all other yellow varieties.

Polishing appeared to cause minimal additional skinning for most varieties compared to harvest evaluations (Figure 1). Lenticel scarring and black dot infection were more obvious and noticeable for most varieties (Figures 2 and 4). Sangre had the least black dot of the reds, while Jacqueline Lee and Alegria had the least amount of black dot for yellows (Figure 4). There was minimal additional shatter bruise from polishing across varieties (Figure 3). Polishing appeared to increase the sheen (glossiness), clarity, and appearance of the surface of the potato skin across entries even though statistics weren't possible (Figures 5 and 6). The sheen of polished tubers seemed to decrease slightly across all varieties after the polished tubers were stored for an additional 30 days (Figure 7). See Figures 8 and 9 for variety pictures and comments.

**Table 1. Harvest Evaluation Results**

Variety	Skinning <sup>1</sup>	Lenticel <sup>1</sup>	Shatter <sup>1</sup>	Skin Darkness <sup>2</sup>	Merit <sup>1</sup>	Eye Depth <sup>3</sup>	Tuber Shape <sup>4</sup>	Uniformity <sup>5</sup>	L/W Ratio <sup>6</sup>
Sierra Rose	5.0	3.3	4.7	4.0	3.8	2.7	2.3	3.7	1.2
NDTX5438-11R	4.3	4.2	4.8	3.7	4.2	4.0	1.8	3.8	1.1
Modoc	4.5	4.3	3.7	3.7	4.0	3.7	2.7	3.8	1.1
Chieftain	4.3	4.5	4.3	2.5	4.0	2.0	3.5	3.8	1.2
Sangre	4.5	3.5	4.8	3.3	4.0	2.8	2.5	4.0	1.1
Yukon Gold	4.5	4.0	4.5	2.7	3.7	3.2	2.2	4.0	1.1
Yukon Nugget	4.7	3.7	4.8	2.7	3.7	3.2	2.5	3.5	1.1
Alegria	4.7	3.8	4.5	2.3	4.2	3.3	3.3	3.8	1.3
Jacqueline Lee	4.8	3.8	4.8	2.5	3.8	3.5	4.5	3.3	1.6
Yukon Gold (S)	4.8	4.3	4.7	2.5	3.8	2.7	2.8	3.8	1.1
95% Conf. Interval	0.5386	NS	0.8227	1.6158	NS	NS	1.3193	NS	0.1231

\*Data from the three vine kill timings were combined for analysis. Yukon Nugget was only evaluated at the 3-week vine kill timing due to lack of seed. Fresh Market Russet Merit Score takes into account multiple factors including; tuber shape, eye depth, russetting, and shape uniformity.

<sup>1</sup> 1=Worst, 5=Best

<sup>2</sup> Rated using a 1-5 flesh color scale. Different scales were used for red and yellow varieties

<sup>3</sup> 1=Deep, 5=Shallow

<sup>4</sup> 1=Round, 5=Oblong

<sup>5</sup> 1= Non Uniform, 5=Very Uniform

<sup>6</sup> Ratio of 10 tubers measured from each plot, 8-16 oz in size

**Figure 1.**

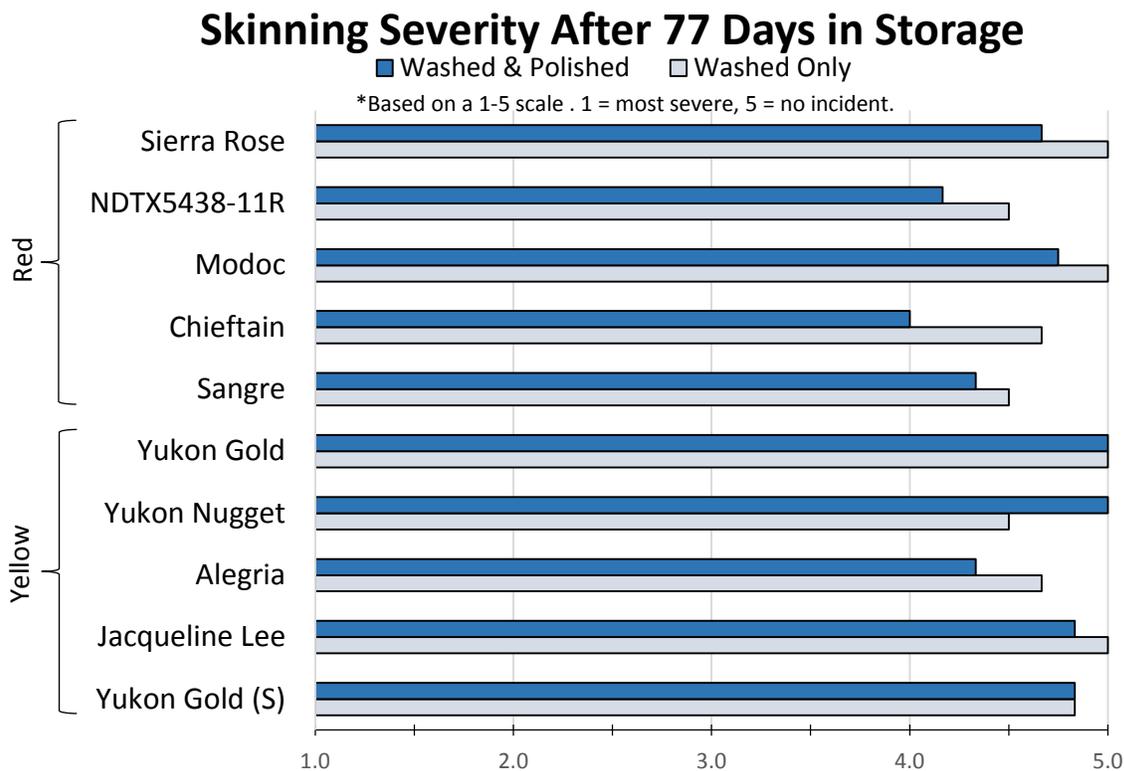


Figure 2.

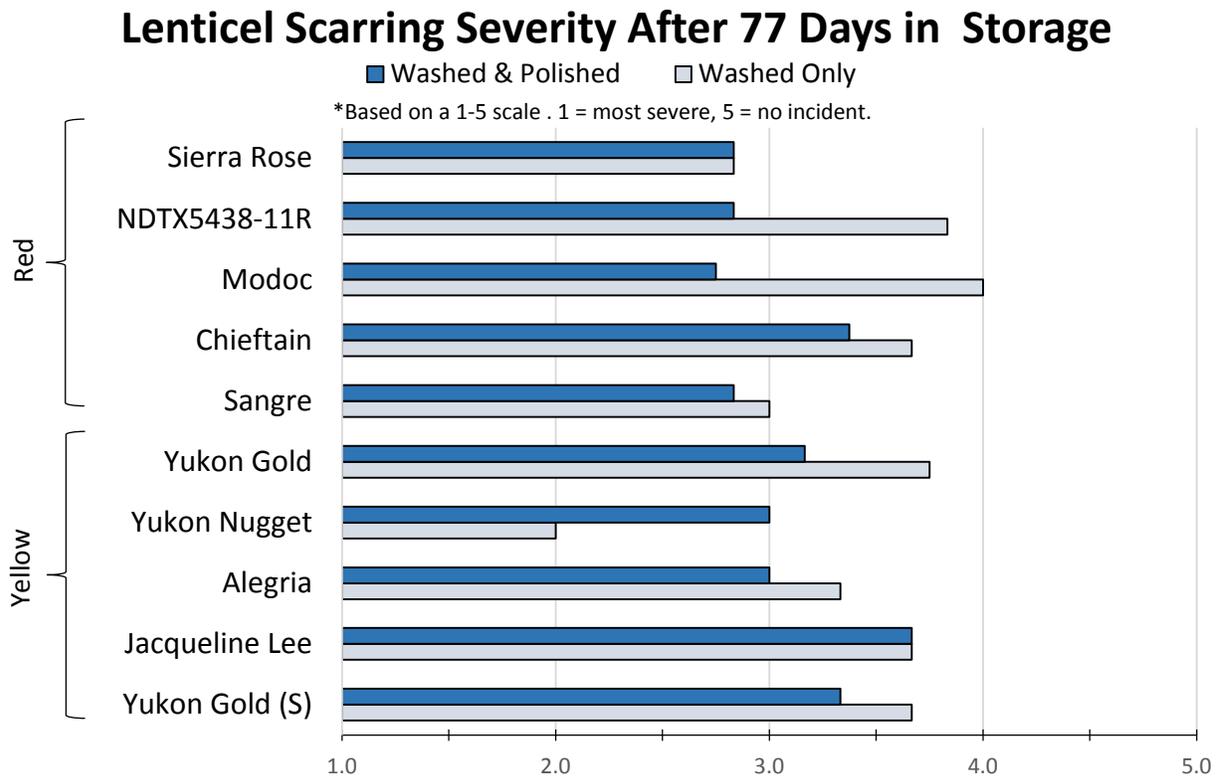


Figure 3.

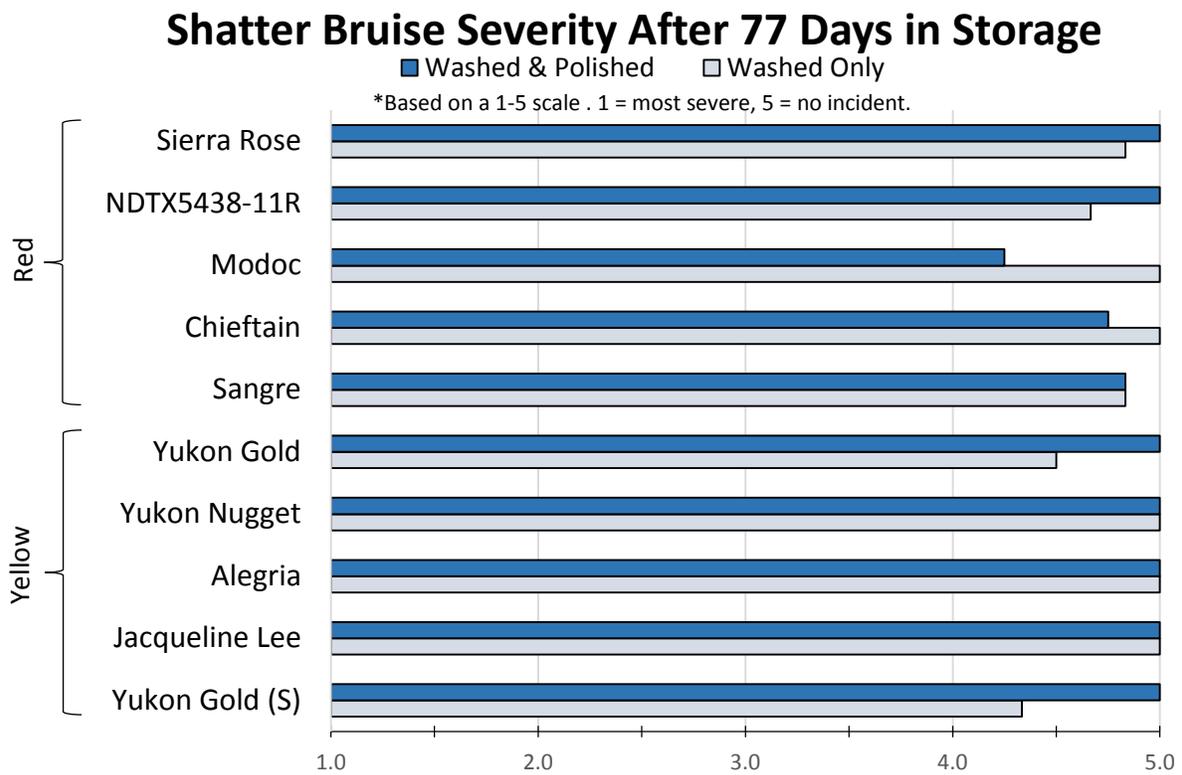


Figure 4.

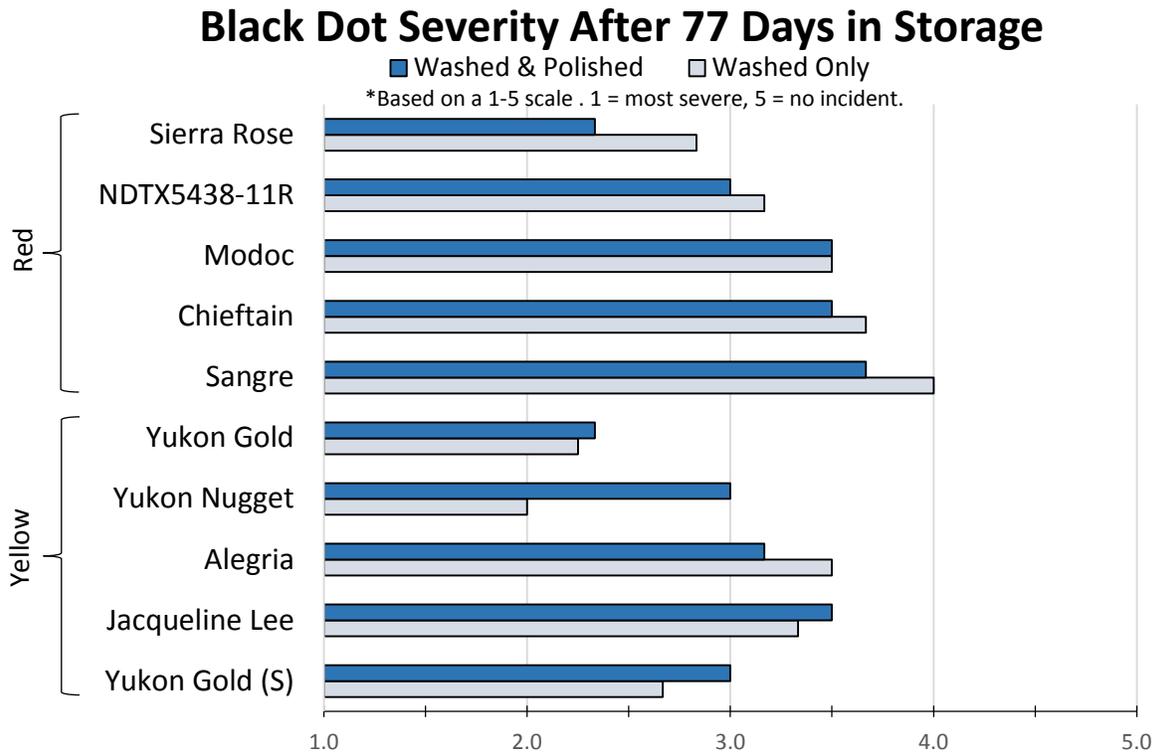


Figure 5.

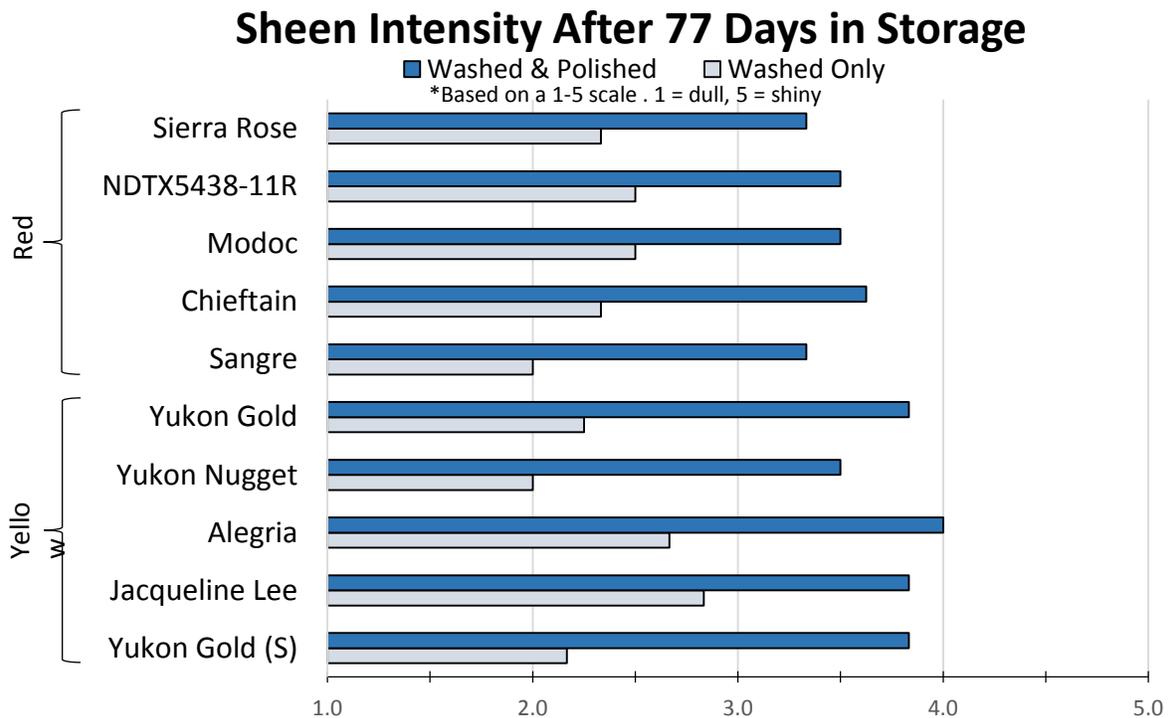


Figure 6.

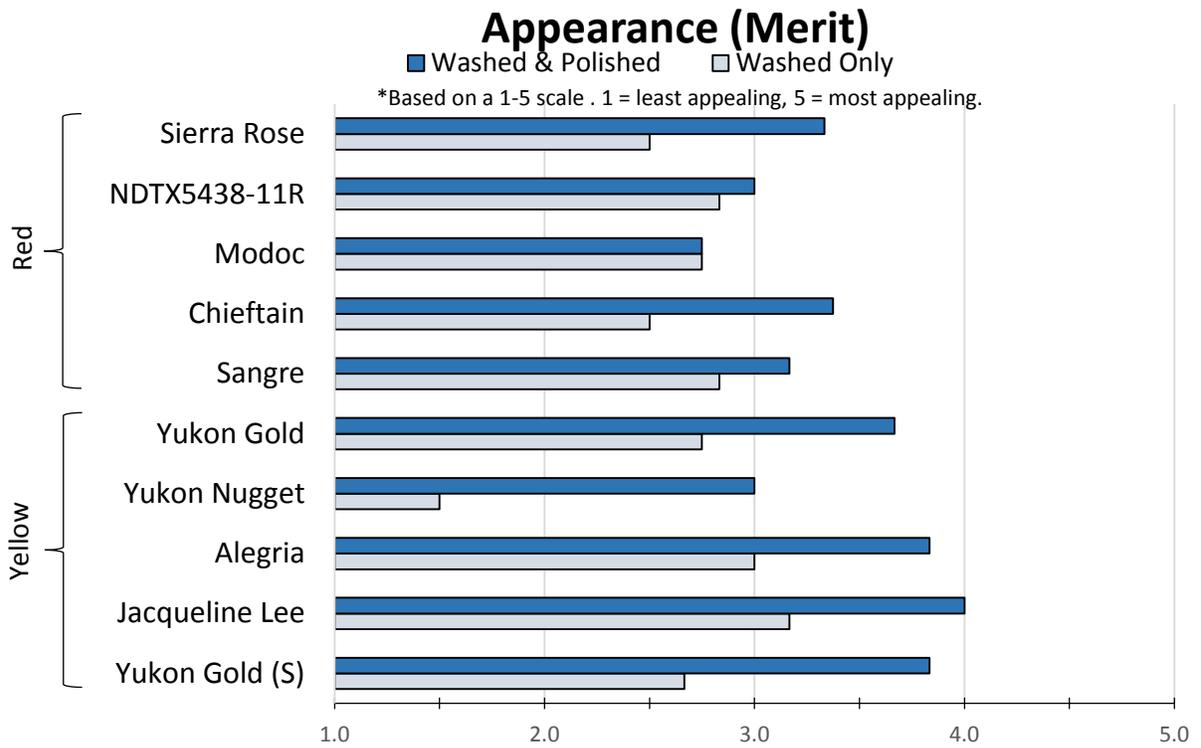


Figure 7.

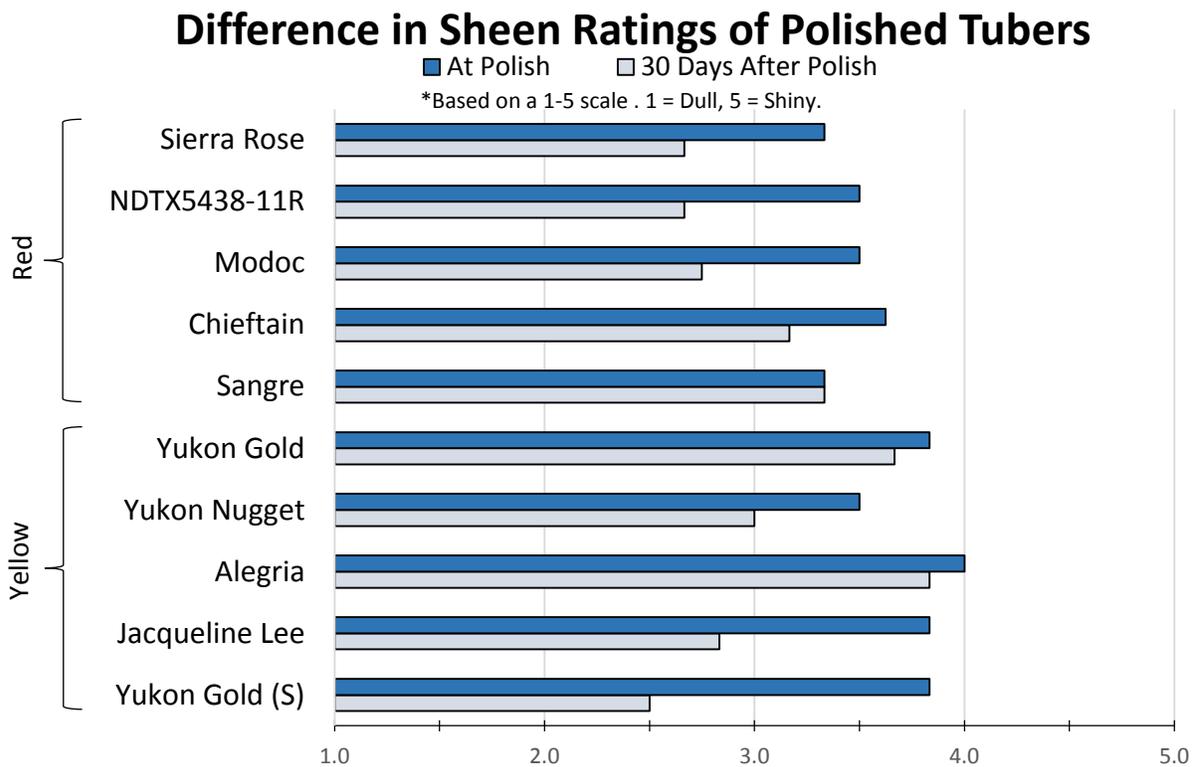


Figure 8.

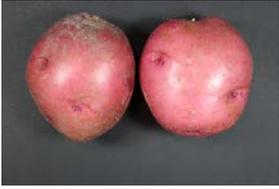
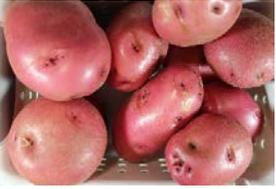
<u>Entry</u>			<u>Tulelake Notes</u>
<b>Sierra Rose</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>● Low amount of skinning</li> <li>● High lenticel scarring</li> <li>● Dark red skin</li> </ul>
			
<b>NDTX5438-11R</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>● Little shatter bruise</li> <li>● High merit score</li> </ul>
			
<b>Modoc</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>● Highest amount of shatter bruise</li> <li>● Dark red skin</li> </ul>
			
<b>Chieftan</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>● Slightly more skinning after polishing than most varieties</li> <li>● Little lenticel scarring</li> <li>● Light red skin color</li> </ul>
			
<b>Sangre</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>● Very little shatter</li> <li>● High Merit</li> <li>● Least amount of black dot for red varieties</li> </ul>
			

Figure 9.

<u>Entry</u>			<u>Tulelake Notes</u>
<b>Yukon Gold</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>• No skinning after polish</li> <li>• High increase in sheen after polish</li> <li>• High incident of blackdot</li> </ul>
			
<b>Yukon Nugget</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>• More lenticel scarring than most</li> <li>• Poor appearance due to pink eyes</li> <li>• Pink eyes increased in size &amp; color during storage</li> </ul>
			
<b>Alegria</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>• High sheen after polishing</li> <li>• Less black dot than most varieties</li> <li>• Good merit score &amp; appearance</li> </ul>
			
<b>Jacqueline Lee</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>• Oblong shape</li> <li>• Highest appearance rating after polishing</li> <li>• Low amount of black dot and lenticel scarring</li> </ul>
			
<b>Yukon Gold (S)</b>			
<b>Unwashed</b>	<b>Wash vs. Wash/Polish</b>	<b>Polished Group</b>	<ul style="list-style-type: none"> <li>• Industry standard</li> </ul>
			