Best Management Practices for Specialty Varieties
Factors that affect consumer potato variety choices

Source: Jemison et al., 2008
Methods to improve skin color

- Waxing (popular in the 1950’s)
- Production regions (soils and climate)
- New varieties (ongoing)
- Growth regulators (use of 2,4-D described in 1949)
What do we know about 2,4-D?

- Auxin-like compound
- Herbicide: broadleaved weeds
- Stimulate cell growth in phloem
- Blockage $\Rightarrow$ starvation $\Rightarrow$ death
- Stimulate ethylene synthesis in potato*
  - Could be direct or indirect

Arteca, R.N. 1982. AJPR 59(6):267-274
Mechanism of color enhancement

“Mechanism of 2,4-D enhancement of red color in potato periderm is not known.” (Rosen, et. al, 2004)*
2,4-D and ethephon have similar impacts on skin color, indicating a common mode of action.
The timing for growth regulator application is fairly narrow (~10 days), corresponding with early tuber development and maximum pigment production.
Maximum pigment development occurs early in tuber development, then skin color fades due to dilution as tuber size increases.
The darker color going into storage – the darker they come out of storage
Growth regulators work best on lighter skinned cultivars. Skin color changes are not visible on dark red, blue or yellow cultivars.

- Red Lasoda
- Purple Pelisse
- Yukon Gem
- Terra Rosa
- All Blue
- Bintje

Photos: http://www.pvmi.org/varieties/Type/htm
Post-harvest practices –
Storage conditions, waxes, disinfectants
Effect of the waxing products on color (left) and appearance (right) of the cultivar All Blue. Color rated 1-5(darkest) and appearance rated 1-5(best).

This product left a thick waxy residue that was not attractive.
How does wax affect shelf life?

Tubers with high disease load may decay more rapidly under high temperatures after waxing.
### Influence of spray application of disinfectant treatments on skin color of All Blue tubers grown at Parma, ID during 2010.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pre-treatment</th>
<th>7 days post treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin color (1-5=darkest)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.0</td>
<td>2.8</td>
</tr>
<tr>
<td>Fit</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Calcium Hypochloride</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Purogene</td>
<td>3.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Storox</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Phos Acid</td>
<td>3.0</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Common disinfectants used in wash water did not affect skin color.
What is the best way to manage tuber size?

- Variety (market may limit choice)
- Stem population (seed size, age and spacing - $$ and logistics)
- Vine kill date (need for precise timing)
Tuber set varies greatly with variety

Source: R. Navarre, USDA
Tuber number and size are related

\[ R^2 = 0.652 \]

2012 Tri-state specialty trial - Parma
What determines stem population?

Seed condition (size and age)

Seed spacing
Tuber size increases with in-row spacing.

- Average tuber size (oz)
- Seed Spacing: 4", 8", 12"
- Varieties: Huckleberry Gold, Red Lasoda, Yukon Gold
However, tuber set also increases with increasing in-row spacing, so you don’t get as much an advantage from close spacing you might expect.

![Graph showing the relationship between tubers per plant and seed spacing for Red Lasoda]

- **Seed Spacing:** 4" to 12"
- **Tubers per plant:** 0 to 12

Legend: Red Lasoda
Seed aging is another way to increase stem number. Aging is most effective right after seed harvest while the tubers are still dormant.

Source: R. Knowles, WSU
**Not all cultivars respond to seed aging**

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Age induced change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umatilla</td>
<td>3.4</td>
</tr>
<tr>
<td>Russet Burbank</td>
<td>3.2</td>
</tr>
<tr>
<td>Satina</td>
<td>1.5</td>
</tr>
<tr>
<td>Shepody</td>
<td>0.8</td>
</tr>
<tr>
<td>Red Lasoda</td>
<td>0.7</td>
</tr>
<tr>
<td>Yukon Gold</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Most sensitive

Least sensitive

Source: R. Knowles, WSU
Gibberellic acid is an alternative for cultivars that do not respond to aging.

Source: Knowles, 2008
Early vine kill is another way to limit tuber size. However, size changes so rapidly that timing is critical.
Acknowledgements