Potatoes
How are Potatoes Used?

Potato Utilization (%), 2007

- Tablestock
- Processing
- Seed & Feed
- Other
Preferred Growing Conditions for Potato

- Deep, well drained soil
- High water holding capacity (without becoming saturated)
  - Soils with high clay content require special management to maintain water drainage and soil structure
- Peat or muck soils are good if they are adequately drained
- Sandy soils require proper irrigation and fertilization
  - Produce high yields with good quality
- Potatoes are tolerant to low pH soils
  - Reduced incidence of common scab in soils with pH<5.4
  - Scab resistant varieties perform well in higher pH soils
Low pH Soils can Limit Nutrient Uptake

Reduced availability of N, P, K, S, Ca and Mg

Increased availability of Al (can be toxic)
Potato Plant Part Description
Potato Growth Stages

**GROWTH STAGE I**
**Sprout development**
Sprouts develop from eyes on seed tubers and grow upward to emerge from the soil
Roots begin to develop at the base of emerging sprouts

**GROWTH STAGE II**
**Vegetative growth**
Leaves and branch stems develop from aboveground nodes along emerged sprouts
Roots and stolons develop at belowground nodes
Photosynthesis begins

**GROWTH STAGE III**
**Tuber initiation**
Tubers form at stolon tips but are not yet appreciably enlarging
In most cultivars the end of this stage coincides with early flowering

**GROWTH STAGE IV**
**Tuber bulking**
Tuber cells expand with the accumulation of water, nutrients, and carbohydrates
Tubers become the dominant site for deposition of carbohydrates and mobile inorganic nutrients

**GROWTH STAGE V**
**Maturation**
Vines turn yellow and lose leaves, photosynthesis decreases, tuber growth slows, and vines eventually die
Tuber dry matter content reaches a maximum, and tuber skins set
# Potato Nutrient Needs

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Vines</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen (N)</td>
<td>90</td>
<td>86</td>
<td>128</td>
<td>171</td>
<td>214</td>
<td>252</td>
</tr>
<tr>
<td>Phosphorus (P)</td>
<td>11</td>
<td>12</td>
<td>17</td>
<td>23</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>75</td>
<td>96</td>
<td>144</td>
<td>192</td>
<td>240</td>
<td>288</td>
</tr>
<tr>
<td>Calcium (Ca)</td>
<td>43</td>
<td>3.0</td>
<td>4.4</td>
<td>5.9</td>
<td>7.4</td>
<td>8.9</td>
</tr>
<tr>
<td>Magnesium (Mg)</td>
<td>25</td>
<td>5.9</td>
<td>8.9</td>
<td>11.8</td>
<td>14.7</td>
<td>17.6</td>
</tr>
<tr>
<td>Sulfur (S)</td>
<td>—</td>
<td>8.8</td>
<td>13.2</td>
<td>17.6</td>
<td>22.0</td>
<td>26.4</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>0.11</td>
<td>0.70</td>
<td>0.11</td>
<td>0.14</td>
<td>0.18</td>
<td>0.22</td>
</tr>
<tr>
<td>Manganese (Mn)</td>
<td>0.17</td>
<td>0.03</td>
<td>0.04</td>
<td>0.06</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>2.21</td>
<td>0.53</td>
<td>0.79</td>
<td>1.06</td>
<td>1.32</td>
<td>1.58</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>0.03</td>
<td>0.04</td>
<td>0.06</td>
<td>0.08</td>
<td>0.10</td>
<td>0.12</td>
</tr>
<tr>
<td>Boron (B)</td>
<td>0.14</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Source: Univ. Minnesota
Potato Nutrient Need

Nitrogen:
- Peak demand 20 – 60 days after planting
- Later applications can delay maturity, poor skin quality

Phosphorus:
- Major role in tuber set

Potassium:
- Important in tuber yield, size, and quality
- Helps prevent bruising and improve storage quality

Calcium:
- Helps maintain storage quality
- Reduces hollow heart
Pro-Germinator Performance

Basin Fertilizer, 2015

Pro-Germinator  7.5 gal/A  vs.  10-34-0  17 gal/A
Applied through irrigation system

Yield (cwt/acre):
Pro-Germinator = 555
10-34-0 = 514

$281 net increase in return  ($7/ cwt potato price)
AgroLiquid Performance

AgroLiquid: Pro-Germinator 8 gal/A (at planting)
  + Sure K 2 gal/A
  + Micro 500 0.5 gal/A
  32% UAN 10 gal/A (at hilling)

Conventional: 12-12-12 900 lb/A (broadcast and incorporated)
**AgroLiquid Performance**


Russet type potatoes, Columbia Basin of WA

** Marketable Yield**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (Cwt./Acre)</th>
</tr>
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<tbody>
<tr>
<td>Conventional w/10-34-0</td>
<td>566.0</td>
</tr>
<tr>
<td>Conv w/ Pro-Germ@Planting</td>
<td>648.0</td>
</tr>
<tr>
<td>Conv. w/ Sure-K</td>
<td>702.0</td>
</tr>
<tr>
<td>Full ACLF Program*</td>
<td>815.0</td>
</tr>
</tbody>
</table>

*Conventional Program was 125-292-150-50(5) prior to/at planting – [10-34-0 @ 35 GPA was applied on the sides of the seed furrow at planting]
*Pro-Germurator at planting treatment replaced 55 gallons of 10-34-0 applied at planting for the conventional program
*ACLF Sure-K @ 12 GPA - 8 GPA as band over the row at planting with eNhance @ 4.1 GPA, 2 x 2 GPA applied in season during irrigation (late June & early July)
Sure-K and eNhance were used instead of potassium sulfate in this treatment, nitrogen and phosphorus were from conventional sources
*In season applications of Nitrogen were pivot applied and identical for all treatments. *Full ACLF Program = average of 2010 & 2011 data only.
PrimAgro Products on Potatoes

Pro-Germinator, Kalibrate, PrimAgro P, or PrimAgro K applied at 5 gal/acre at planting. C-Tech Applied at 0.5 gal/acre at side dress.

Apply C-Tech at Side Dress (after tuber formation)