Pulse Crop Production and Management for Successful Conservation Tillage Cropping Systems
Grain Legumes in the News

- **Pulses**: The edible dry seeds of plants in the legume family.
Grain Legumes in the Market

- In 2015, 485,000 acres of lentils, 1,008,000 acres of peas, and 196,900 acres of chickpeas were planted in the USA.

- Domestic demand has grown with popularity of new food and snack products.

- Pulses are a good source of protein, vitamins, dietary fiber, and phytochemicals.
Agronomic Benefits to PNW Cropping Systems

- Grain legumes are environmentally friendly crops
- All legumes have the ability to form symbiotic associations with Rhizobia bacteria to fix atmospheric N
  - Reduces N fertilizer inputs
  - Contributes residual N to the soil
  - Low in crop soil acidification rate
- Beneficial to the soil and efficiently use water
- Fit easily into rotations, and introduce crop diversity to break pest cycles
- Measurable benefits to wheat following grain legumes
  - Yield benefits up to 20% (Miller et al., 2002; Wright, 1990)
  - Increases in grain protein up to 18% (Gan et al., 2003)
“Crop rotation is probably the single most critical factor affecting the health and productivity of a future wheat crop.”
Wheat Yields – IPM study

Fig. 1. Five-year average of winter wheat yield in response to tillage systems and rotation position. Within tillage systems

F.L. Young et al., 1994
Pea Yields – IPM study

Fig. 1. Six-year average of spring dry pea yield in response to tillage systems and weed management levels ($P = 0.069$). Within a tillage

F.L. Young et al., 1994
Australia: wheat following pulse crops – Angus et al.
Winter Wheat Yield Following Rotational Crops – Moscow, ID
Expressed as a % of Yield Following Pea

- Dry Pea: 100%
- Win. Wheat: 76%
- Sp. Wheat: 84%
- Sp. Barley: 82%
- Win. Rape: 85%
- Sp. Canola: 96%
- Yel. Mustard: 98%
- Br. Mustard: 98%
- Crambe: 99%
- Lentil: 99%
Autumn-Sown Peas
New Potential

Spillman Farm
5 January 2016
Windham Winter Pea Grown in Washington

<table>
<thead>
<tr>
<th>Location</th>
<th>Acres</th>
<th>Yield (lb/A)</th>
<th>$ per lb.</th>
<th>Gross $/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ritzville (12”)</td>
<td>47</td>
<td>1810</td>
<td>0.18</td>
<td>325</td>
</tr>
<tr>
<td>Sprague (16”)</td>
<td>146</td>
<td>3840</td>
<td>0.18</td>
<td>690</td>
</tr>
<tr>
<td>Waterville (15”)</td>
<td>217</td>
<td>3660</td>
<td>0.18</td>
<td>660</td>
</tr>
</tbody>
</table>
Davenport – NT
Summer fallow
Planted 8/27
Davenport, planted 9/10

one month

Two months
Mt. Vernon, 2 months after planting
Spillman Planted 10/8
Lind

Planted 9/4
Conventional
Deep-furrow

Emergence
9/28
Faba Bean

Prosser

Davenport
Why Winter Pea Can Work in Conservation Systems:

1. Excellent rotation crop for winter wheat
2. Economic potential – viable crop returns
   a) High yield potential
   b) Reliable market
   c) Diversified farm income
3. Planting and emergence flexibility
4. Winter survival is good
5. N fixation – low fertilizer input
6. Wide adaptation across rainfall zones
7. International Year of the Pulse
8. Low soil acidification during this crop
9. Good water use efficiency
10. Residue is easily managed
11. There is no better rotation crop for winter wheat
Thank you!
WSU Legume Variety Testing Program & USDA-ARS Grain Legume Genetics and Physiology Research Unit
Technical Help: Mary Lauver & Jarrod Pfaff