Objectives

• Determine how five different WW residue management practices affect WC health and yield.
• Determine the cause(s) for decline in WC vigor and yield as affected by WW residue management.
• Test methods to retain WW residue without adversely affecting WC.
• Disseminate results of research through field days, grower meetings, an extension bulletin, and a scientific journal articles.
Theories

- Straw produces toxic compounds.
- Decomposing straw immobilizes nitrogen.
- Excess straw interferes with drill performance.
- Excess straw keeps soils too wet and cool.
- Straw shades WC seedlings and interferes with photosynthesis.
- Straw serves as a food base for soil-borne pathogens, increasing disease, especially for Pythium and Rhizoctonia.
- Elongated hypocotyl in tall WW stubble makes WC more susceptible to winter damage.
Irrigated Winter Canola Experiment

- Treatments (established on fresh irrigated winter wheat stubble):
  - Burn + double disk
  - Chop stubble + moldboard plow
  - Burn + direct seed
  - Direct seed into standing residue
  - Broadcast into not-yet-harvested wheat (New in CY 2014)

- Randomized complete block design with four replicates (i.e., 20 plots). Each plot 100-ft long.
Equipment hauled from the Lind Station to conduct the experiment

- “Big Red” (fire truck)
- Wheel tractor (75 hp)
- Stubble chopper
- Double disk, 10 ft wide
- Moldboard plow, 4 ft wide
- Smeizer packer (pulled behind disk and moldboard plow)
- Kile hoe-opener drill, 8 ft wide
- Plot sprayer
- Plot combine
Direct seeding into newly-harvested 141 bushel winter wheat stubble cut 15 inches above the ground
Burn- Disk  Burn- Direct Seed
Burn - Direct Seed
Direct Seed
Irrigated canola plant population measurement for three years at Jeff Schibel’s farm near Odessa, WA.

<table>
<thead>
<tr>
<th>Method</th>
<th>2013</th>
<th>2014</th>
<th>2-yr avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stubble burned + disked</td>
<td>45</td>
<td>73 a</td>
<td>59 a</td>
</tr>
<tr>
<td>Stubble burned + direct-seeded</td>
<td>34</td>
<td>47 b</td>
<td>41 b</td>
</tr>
<tr>
<td>Stubble chopped + moldboard plowed</td>
<td>36</td>
<td>49 b</td>
<td>43 b</td>
</tr>
<tr>
<td>Direct seeded into standing stubble</td>
<td>40</td>
<td>63 ab</td>
<td>52 ab</td>
</tr>
<tr>
<td>Broadcast into standing wheat</td>
<td>*</td>
<td>**</td>
<td></td>
</tr>
</tbody>
</table>

Statistical significance
- ns (p = 0.15)
- p = 0.008
- p < 0.001

* The broadcast into standing wheat before harvest treatment was not present in 2013.
** Canola killed by cold temperatures in 2014.
ns = No significant statistical differences at P<0.05.
Effect of Residue Treatments on Emergence and Damping-Off of Canola, Schibel Plot, Sampled Oct., 2016

![Bar chart showing the effect of residue treatments on emergence and damping-off of canola. The treatments include burned and disked, chopped and seed standing stubble, direct seed standing stubble, burned and direct seeded, and broadcast. The chart illustrates the percentage of emergence and damping-off for each treatment.]
<table>
<thead>
<tr>
<th>Firebreak</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

5 XXXX treatment was disked

10/19/2016
Burn-
Direct
Seed
Irrigated canola seed yield measurement for three years at Jeff Schibel’s farm near Odessa, WA.

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2017</th>
<th>3-yr avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stubble burned + disked</td>
<td>3092</td>
<td>2832</td>
<td>2776 ab</td>
<td>2900</td>
</tr>
<tr>
<td>Stubble burned + direct-seeded</td>
<td>3020</td>
<td>2678</td>
<td>2795 ab</td>
<td>2831</td>
</tr>
<tr>
<td>Stubble chopped + moldboard plowed</td>
<td>3246</td>
<td>1830</td>
<td>3158 a</td>
<td>2745</td>
</tr>
<tr>
<td>Direct seeded into undisturbed stubble</td>
<td>2988</td>
<td>**</td>
<td>2218 bc</td>
<td></td>
</tr>
<tr>
<td>Broadcast into standing wheat</td>
<td>*</td>
<td>**</td>
<td>1939 c</td>
<td></td>
</tr>
<tr>
<td>Statistical significance</td>
<td>ns ($p = 0.40$)</td>
<td>ns ($p = 0.06$)</td>
<td>$p &lt; 0.001$</td>
<td>ns ($p = 0.52$)</td>
</tr>
</tbody>
</table>

* The broadcast into standing wheat before harvest treatment was not present in 2013.
** Canola killed by cold temperatures in 2014.
ns = No significant statistical differences at P<0.05.
Thank you to the Washington Department of Ecology’s Agriculture Burning Task Force and Jeff Schibel for support of this research.