MANAGEMENT OF FRESH WHEAT RESIDUE FOR IRRIGATED WINTER CANOLA

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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 for CY 2014)

- Randomized complete block design with four replicates (i.e., 20 plots). Each plot 100-ft long.
Broadcast into standing wheat
Chopped + moldboard plow
Burned + Direct seed
Irrigated winter canola seed yields during the first two years of the fresh wheat stubble management experiment conducted near Odessa, Washington.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>2013</th>
<th>2014</th>
<th>2-yr avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stubble burned + disked</td>
<td>3092</td>
<td>2832</td>
<td>2962</td>
</tr>
<tr>
<td>Stubble burned + direct-seeded</td>
<td>3020</td>
<td>2678</td>
<td>2849</td>
</tr>
<tr>
<td>Stubble chopped + moldboard plowed</td>
<td>3246</td>
<td>1830</td>
<td>2538</td>
</tr>
<tr>
<td>Direct seeded into undisturbed stubble</td>
<td>2988</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Broadcast into standing wheat</td>
<td>*</td>
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<tr>
<td>Statistical significance</td>
<td>ns (p = 0.40)</td>
<td>ns (p = 0.06)</td>
<td>ns (p = 0.11)</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.
Disease Conclusions

• Good emergence in bioassays, no effect of residue treatment or tillage.

• Very low level of *Rhizoctonia solani* AG 2-1 in bioassay, no effect of residue treatment or tillage.

• Does rotation with potatoes and fumigation with Vapam every few years reduce this pathogen?
Thank you to the Washington Department of Ecology’s Agriculture Burning Task Force and Jeff Schibel for continued support of this research.