DRYLAND AND IRRIGATED OILSEED CROPPING SYSTEMS

**PI:** Bill Schillinger, WSU

**Collaborating Scientists:** Jeremy Hansen, WSU; Tim Paulitz, USDA-ARS; Brenton Sharratt, USDA-ARS; Stewart Wuest, USDA-ARS; John Jacobsen, WSU; and Steve Schofstoll, WSU

**Farmer Collaborators:** Jeff Schibel, Odessa; Ron Jirava, Ritzville; Hal Johnson, Davenport; Derek Schafer, Ritzville
Direct seeding winter canola into heavy irrigated winter wheat stubble instead of burning and disking at Jeff Schibel farm near Odessa.
Safflower at Ritzville in 2015
New 3-year winter canola rotation added in 2015 at long-term cropping systems trial at Ritzville. Winter canola – spring wheat – undercut tillage fallow.
New cropping systems study initiated at Ritzville in 2014
WC – NTF – WT – NTF
WP – NTF – WT – NTF
WW - UTF
Camelina cropping systems experiment at Lind. WW – C – SF versus WW – SF. Now in seventh year.
Soil water content at the beginning (after harvest), early spring, and the end of fallow (just before planting of winter wheat) and associated gain or loss of water and precipitation storage efficiency (PSE = gain in soil water/precipitation that occurred during the fallow period) in the 6-foot soil profile in summer fallow in a 2-year winter wheat-fallow rotation versus a 3-year winter wheat-camelina-fallow rotation. Data are a 6-year average.

<table>
<thead>
<tr>
<th>Timing in fallow period</th>
<th>Soil water content (inches)</th>
<th>Mar. to Aug. water</th>
<th>PSE † (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning (late Aug.)</td>
<td>6.3</td>
<td>9.8</td>
<td>3.5</td>
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<tr>
<td>Spring (mid Mar.)</td>
<td>9.8</td>
<td></td>
<td></td>
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<tr>
<td>Over-winter gain</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End (late Aug.)</td>
<td>9.2</td>
<td></td>
<td></td>
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<tr>
<td>Mar. to Aug. water</td>
<td></td>
<td></td>
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<tr>
<td>p-value</td>
<td>0.04</td>
<td>ns</td>
<td>ns</td>
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<tr>
<td>Fallow treatment</td>
<td>After winter wheat (2-yr rotation)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>After camelina (3-yr rotation)</td>
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</tbody>
</table>
Non-toxic seed treatments to deter horned lark feeding of pre-emerged winter canola seedlings. New study at Lind in 2016.

- WSU Fact Sheet on horned lark coming soon.
- New study on canola seed treatment in 2016 at Lind in collaboration with Dr. Scott Werner, USDA-APHIS ornithologist.
Stripper header: Residue height on water conservation
Current Publications

Referred Journal Articles


• Schillinger, W.F., and S.J. Werner. First report of horned lark damage to pre-emerged canola seedlings. *Industrial Crops and Products* (to be submitted next week).

WSU Fact Sheet

SOIL MICROBIAL COMMUNITY CHANGES WITH INCLUSION OF OILSEED CROPS INTO CEREAL GRAIN ROTATIONS

PhD Dissertation Research

Jeremy C. Hansen
William F. Schillinger, Ann C. Kennedy, Tarah S. Sullivan
USDA-ARS, Washington State University

WASHINGTON OILSEED CROPPING SYSTEMS
Part of the Washington State Biofuels Initiative
Soil and rhizosphere microbial communities in agroecosystems may be affected by soil type, climate, plant species, and management. The plant species (oilseed crops) and management (rotation) factors will be investigated with four field scale experiments.
Field Scale Studies

- Canola (Davenport, WA)
- Camelina (Lind, WA)
- Safflower (Ritzville, WA)
- Rhizosphere (Ritzville and Mansfield, WA)
β-Glucosidase Activity
Canola study (Davenport)

β-Glucosidase Activity 0 to 5 cm

![Bar chart showing β-Glucosidase Activity 0 to 5 cm for Canola and Wheat across different years. The chart includes data for sample and crop years from 2008 to 2014. The chart compares the activity levels for Canola and Wheat, with different letters indicating significant differences between years.](attachment:beta-glucosidase_activity_chart.png)
Mycorrhizal Biomarkers
Canola study (Davenport)

Mycorrhizae 0 to 5 cm

<table>
<thead>
<tr>
<th>Sample Year</th>
<th>Crop Year</th>
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<tbody>
<tr>
<td>2008</td>
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<td>2009</td>
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<td>2013</td>
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<td>2014</td>
<td>2014</td>
</tr>
</tbody>
</table>

mol % Mycorrhizae Biomarker

- Canola
- Wheat

Legend:
- Canola
- Wheat

Note: Different letters indicate significant differences.