Weed Management Strategies in Brassica and Other Oilseed Crops

Rachel Zuger, Joe Yenish, Frank Young, and Ian Burke
Canola/ Rapeseed
Preplant Incorporated

- **Sonalan**
  - Preplant Incorporated
  - 5.5 - 9.5 # of Sonalan 10G/ A
  - 1.5-2.5 pts of Sonalan HFP/ A

- **Treflan**
  - Preplant Incorporated
  - 5 - 10 # Treflan TR10/ A
  - 1 - 2 pints Treflan HFP/ A
Canola/ Rapeseed

Postemergence

- **Grasses**
  - **Assure II**
    - 5 to 12 oz/ appl.
    - ≤18 oz/ season
  - **Poast**
    - 1 to 2.5 pts/ appl.
    - ≤5 pts/ season
  - **Select 2EC**
    - clethodim
    - ≤6 oz/ appl.
    - ≤16 oz/ season
**Broadleaf Weeds**

*Postemergence*

- **Stinger, Others (Clopyralid)**
  - 1 application per crop
  - 2 to 6 leaf crop stage
  - 0.25 to 0.5 pt/ A
  - May be tankmixed
  - Could compromise rotation~**Legumes**
Herbicide-Resistant Weed Management Systems

- GMO’s
  - LibertyLink®
  - Roundup Ready®
- NonGMO’s
  - Clearfield®
  - Conventional
  - SU tolerance
  - ExpressSun™
    - Sunflowers only
Herbicide Resistant Canola

Clearfield

- Only Clearfield Canola may be planted in the next season following Pursuit, Raptor, or Beyond at labeled rates
- 26 month plant-back for non-Clearfield Canola varieties
Herbicide-Resistant Canola

Clearfield

- Clearfield seed
- Beyond herbicide
  - Only for use in Clearfield Canola, Sunflower, or Wheat
  - Apply 4 oz Beyond/A + surfactant + N fertilizer
  - Label recommends soil applied grass herbicide prior to Beyond
  - Early POST but before canola bloom
Herbicide-Resistant Canola
Roundup Ready

- Roundup Ready Seed
- Roundup and other glyphosate herbicides
  - Glyphosate only
  - Roundup Powermax (4.5# a.e./gal.)
Roundup Ready Canola

- **Winter Canola**
  - Single application
    - 16 to 22 oz./A Fall
  - Sequential
    - 11 to 22 oz./A Fall +
    - 11 to 22 oz./A Spr.
  - Emerge to bolting canola
  - Up to 44 oz preplant, planting, preemergence
  - Up to 44 oz POST

- **Spring Canola**
  - Up to 44 oz preplant, planting, preemergence
  - Up to 22 oz POST
  - Emerge to 6 lf canola
Herbicide-Resistant Canola LibertyLink®

- LibertyLink seed
- Liberty herbicide
  - Glufosinate
  - 28 to 34 oz./A per application
  - Sequential 20 oz./A plus 20 oz./A
  - Do not exceed 68 oz/A per crop
  - 70 day plantback to wheat, barley, & triticale
Adoption rates of genetically engineered alfalfa, sugarbeets, and canola

Note: Sugarbeets and canola adoption rates are measured as a percentage of planted acres; alfalfa as a percentage of harvested acres.
Source: USDA, Economic Research Service using data from the International Service for the Acquisition of Agri-biotech Applications and the National Agricultural Statistics Service.
Choosing a System

- Conventional canola can be challenging - Russian thistle and other weeds are difficult to control.
- Roundup resistant canola is a descent fit, except that we use so much Roundup in fallow.
  - Roundup resistant Russian thistle is in the state!
- Liberty doesn’t work well in low humidity...or on grasses...and it’s more expensive.
- Clearfield Canola isn’t a rotation for weed management.
- So...think critically before choosing...
<table>
<thead>
<tr>
<th>Treatments</th>
<th>Rate</th>
<th>Timing</th>
<th>D. Brome</th>
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</table>
Feral rye control  February 19, 2010

Controlled feral rye in roundup ready winter canola from 2009 fallow
Controlled on right  Check strip not sprayed on left  Winter canola
North Douglas County  Seeded August 20, 2009
Feral Rye control 4/23/ 2010

Second crop of feral rye in roundup ready winter canola after 2009 fallow
Controlled skeletons nearby and in distance. Rye growth since Feb spray
North Douglas Co. Seeded August 20, 2009
Carryover and Drift in Brassica and Other Oilseed Crops

Rachel Zuger
Ian Burke
Joe Yenish
Frank Young
Overview

• pH and Carryover in Canola
• Thoughts on Canola Weed Management Systems
• Injury Symptoms in Canola
As the pH of soil changes, so can the charges of soil particles and HERBICIDES.

Consequences of soil pH

- **Acid** (pH 0-3): the substance is acidic; there are more hydrogen ions in the substance than hydroxide ions.
- **Neutral** (pH 7): the substance is neutral, and the amounts of hydrogen ions and hydroxide ions are equal.
- **Alkaline** (pH 9-14): the substance is alkaline; there are more hydroxide ions in the substance than hydrogen ions.
CLIMATE

- **Warm** Soil Temp.
- ↓ Soil Moisture

- **Cold** Soil Temp.
- ↑ Soil Moisture
Water Solubility of Pyroxsulam

Powerflex

pKa

Water Solubility g L⁻¹ at 20°C

pH

3 4 5 6 7 8 9 10

0 2 4 6 8 10 12 14 16
Othello, WA
pH = 8.4
CEC = 19.2

Valleyford, WA
pH = 4.3
CEC = 18.0
# Generalization of Herbicide Persistence by Chemistry

<table>
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<tr>
<th>Herbicide Family (pKa)</th>
<th>Acid Hydrolysis</th>
<th>Neutral pH</th>
<th>Alkaline pH</th>
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<td>Thifensulfuron (5.0)</td>
<td>Acid hydrolysis</td>
<td>Slower acid hydrolysis</td>
<td>Adsorption</td>
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<td>Metsulfuron (3.8)</td>
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<tr>
<td>Imazethapyr (3.6)</td>
<td>Adsorption</td>
<td>Microbial Deg</td>
<td>Microbial Deg</td>
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<tr>
<td>Imazamox (4.2)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pyroxsulam (5.2)</td>
<td>Adsorption</td>
<td>Microbial Deg</td>
<td>Microbial Deg</td>
</tr>
<tr>
<td>Florasulam (5.0)</td>
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</tr>
</tbody>
</table>

Every herbicide molecule is unique!
### Soil characteristics at each study location.

<table>
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<tr>
<th>Location</th>
<th>pH</th>
<th>% OM</th>
<th>CEC</th>
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<tbody>
<tr>
<td>2012</td>
<td>5.8</td>
<td>3.63</td>
<td>29.2</td>
</tr>
<tr>
<td>2014</td>
<td>5.9</td>
<td>2.36</td>
<td>18.6</td>
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</table>

![Bar chart showing % injury for various treatments at different locations and years.](chart.png)
<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Rotational Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pursuit</td>
<td>Imazethapyr</td>
<td>40 mo + bioassay</td>
</tr>
<tr>
<td>Beyond</td>
<td>Imazamox</td>
<td>26 mo (non-Clearfield)</td>
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<tr>
<td></td>
<td></td>
<td>Clearfield canola = anytime</td>
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<tr>
<td>Everest 2.0</td>
<td>Flucarbazone</td>
<td>9 mo</td>
</tr>
<tr>
<td>Outrider</td>
<td>Sulfosulfuron</td>
<td>Less than 24” rainfall than 22 mo</td>
</tr>
<tr>
<td>Powerflex</td>
<td>Pyroxsulam</td>
<td>9 mo</td>
</tr>
<tr>
<td>Clarity, others</td>
<td>Dicamba</td>
<td>120 d at rates below 24 oz/A</td>
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<tr>
<td>Sencor</td>
<td>Metribuzin</td>
<td>12 mo</td>
</tr>
<tr>
<td>Liberty</td>
<td>Glufosinate</td>
<td>120 d</td>
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<tr>
<td>Ally</td>
<td>Metsulfuron</td>
<td>10 to 22 mo depending on pH</td>
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</tbody>
</table>

Injury Symptoms

- **Amanda** – Conventional
- **Hyclass** – Roundup Ready
- **L140P** – LibertyLink
- **S535CL** – Clearfield
- **WSU-HT1 & Calena** – Camelina
Questions

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Extension Bulletins
PNW 0437
Herb. Res. Weeds & Their Mgmt.
PNW 0571
Plantback Restrictions...
PNW 0572

http://ext.wsu.edu/
http://www.uidaho.edu/extension/