Life and Death of a Cover Crop

Bill Curran, Penn State University
(wcurran@psu.edu)
Outline

• Think about herbicide programs before you seed your cover crop
• Selecting herbicides for cover crop control
Cover crops – can be a valuable part of the cropping system

Hairy Vetch

Cereal Rye

Oats

Red Clover

Forage Radish

Winter Wheat
Residual Herbicides

- Used in many of our major crops
- Usually soil applied – not always
- Generally provide 8 to 12 weeks of weed control
- Half-life too short - lack of residual weed control (performance reduced)
- Half life too long - carryover to following crop
  - Very important consideration for some crops and especially those established in late summer/fall
Herbicide carryover to wheat
Carryover Injury to Subsequent Crops Depends On:

• Herbicide **persistence** in soil
  – How long does it last?
  – Herbicide **half-life** gives us some indication

• Rotational crop **sensitivity/susceptibility**
  – How sensitive are rotational crops - legumes, radish/mustards, grasses

• Persistent herbicides that **aren’t** very active and short-lived herbicides that **are** very active don’t really matter
Planning Ahead –
know your herbicide residual

- Check a current PSU Agronomy Guide – recrop tables
- Check label for use restrictions – recrop tables
  - Soil texture and pH – heavy soil and high pH = last longer
  - Consider drought – last longer – long half-life becomes longer
  - Consider particularly sensitive crops – tobacco, alfalfa, clovers, ryegrass, others
  - Application rate and method impact persistence
  - PRE vs. POST - time between application and next crop
  - Tillage system
    - No-till vs. tilled systems – tillage dilutes residues
  - Herbicide combinations – two or more with longer half-lives increases injury potential
Table 2.2-17. Example corn herbicide rotational restrictions (months after application).

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Alfalfa</th>
<th>Clover</th>
<th>Grain sorghum</th>
<th>Soybeans</th>
<th>Spring Oats</th>
<th>Winter Barley</th>
<th>Winter rye</th>
<th>Winter Wheat</th>
<th>Longest</th>
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</thead>
<tbody>
<tr>
<td>Accent</td>
<td>10</td>
<td>19</td>
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<td>8</td>
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<td>SY</td>
<td>NR</td>
<td>NY</td>
<td>SY</td>
<td>NY</td>
<td>NY</td>
<td>NY</td>
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<td>Balance</td>
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<td>18</td>
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<td>4</td>
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</tr>
<tr>
<td>Dual</td>
<td>4</td>
<td>9</td>
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<td>NR</td>
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<td>4.5</td>
<td>4.5</td>
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</tr>
<tr>
<td>Hornet</td>
<td>10.5</td>
<td>26</td>
<td>12</td>
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<td>4</td>
<td>4</td>
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<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Prowl</td>
<td>NY</td>
<td>NY</td>
<td>NY</td>
<td>NR</td>
<td>NY</td>
<td>4</td>
<td>NY</td>
<td>4</td>
<td>NY</td>
</tr>
<tr>
<td>Sharpen - 1 oz</td>
<td>4</td>
<td>4</td>
<td>NR</td>
<td>0</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>*Lumax</td>
<td>18</td>
<td>18</td>
<td>NY</td>
<td>NY</td>
<td>NY</td>
<td>4.5</td>
<td>4.5</td>
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<td>NY</td>
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</tbody>
</table>

* Mixture of Atrazine + Callisto + Dual
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<td>SY</td>
<td>NY</td>
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<tr>
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<td>4</td>
<td>18</td>
</tr>
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<td>Callisto</td>
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<td>18</td>
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<td>NR</td>
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<td>4</td>
<td>4</td>
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<tr>
<td>Dual</td>
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<td>9</td>
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<tr>
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<tr>
<td>Sharpen - 1 oz</td>
<td>4</td>
<td>4</td>
<td>NR</td>
<td>0</td>
<td>NR</td>
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<td>NR</td>
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<tr>
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<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>NY</td>
</tr>
</tbody>
</table>

* Mixture of Atrazine + Callisto + Dual
Callisto® Label

- Immediate – corn, asparagus, cranberry, millet, grasses grown for seed, oats, and sorghum
- 120 days – small grains
- 10 mo. – alfalfa, canola, cotton, potatoes, soybean, sunflower, tobacco
- 18 mo. – sugar beets, dry beans, peas, cucurbits, red clover, and all other rotational crops
Carryover Injury to Subsequent Crops Depends On:

• Herbicide **persistence** in soil
  – How long does it last?
  – Herbicide half-life gives us some indication

• Rotational crop **sensitivity/susceptibility**
  – How sensitive are rotational crops - legumes, radish/mustards, grasses

• Persistent herbicides that aren’t very active and short-lived herbicides that are very active don’t really matter
#1 Herbicide Persistence

- **Half-life**: the amount of time needed to degrade half of the herbicide present

![Graph showing herbicide persistence over time with half-lives for 2,4-D and Atrazine]
Herbicide half-life
General Rule

• Short - < 30 days
• Intermediate - 30 –120 days
• Long - > 120 days
Common Herbicide’s Half-Life

- 2,4-D – 7 days
- Atrazine – 60 days
- Callisto – 5-50 days
- Clarity – 14 days
- Dual Mag – 15-50 (35) days
- Impact – 14 days
- Pursuit – 60 – 90 (75) days
- Resolve – 7 days
# Corn Herbicide Categories

<table>
<thead>
<tr>
<th>≥ 4 months</th>
<th>2-4 months</th>
<th>≤ 2 months</th>
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<tbody>
<tr>
<td>- Atrazine*</td>
<td>- Accent*</td>
<td>- 2,4-D</td>
</tr>
<tr>
<td>- Balance</td>
<td>- Capreno</td>
<td>- Clarity/Banvel</td>
</tr>
<tr>
<td>- Callisto</td>
<td>- Dual</td>
<td>- Glyphosate</td>
</tr>
<tr>
<td>- Corvus</td>
<td>- Harness/Degree</td>
<td>- Liberty</td>
</tr>
<tr>
<td>- Permit*</td>
<td>- Impact/Armezon</td>
<td>- Harmony</td>
</tr>
<tr>
<td>- Simazine*</td>
<td>- Metribuzin</td>
<td>- Resolve*</td>
</tr>
<tr>
<td>- Stinger/Hornet</td>
<td>- Outlook</td>
<td>- Sharpenn</td>
</tr>
<tr>
<td>- Python</td>
<td>- Prowl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Zidua</td>
<td></td>
</tr>
</tbody>
</table>

*last longer when soil pH > 6.8
Atrazine and Mesotrione

- **Atrazine**
  - Anthem ATZ
  - Bicep
  - Callisto Xtra
  - Degree Xtra
  - Guardsman
  - Harness Xtra
  - Keystone
  - Lumax/Lexar
  - Steadfast ATZ

- **Mesotrione**
  - Callisto
  - Callisto Xtra
  - Halex GT
  - Instigate
  - Lumax/Lexar
  - Realm Q
  - Zemax
Soybean Herbicide Categories

≥ 4 months
- Authority
- Classic (Canopy etc)*
- FirstRate
- Pursuit
- Python
- Reflex/Flexstar
- Scepter

2-4 moths
- Assure/Targa
- Dual
- Raptor
- Metribuzin
- Outlook
- Prowl
- Valor
- Zidua

≤ 2 months
- 2,4-D
- Glyphosate
- Liberty
- Harmony
- Select
- Sharpen

*Last longer when soil pH > 6.8
Chlorimuron and Imazethapyr

- Chlorimuron
  - Authority XL
  - Canopy
  - Canopy EX
  - Cemax
  - Cloak
  - Cloak EX
  - Classic
  - Curio
  - Envive
  - FallOut
  - Valor XLT

- Imazethapyr
  - Authority Assist
  - Extreme
  - Optill
  - Pursuit
  - Pursuit Plus
  - Thunder
  - ThunderMaster
  - Tackle
#2 Crop sensitivity

- **Atrazine**: alfalfa = clovers > radish = ryegrass/timothy > hairy vetch = pea > oats > wheat = barley = rye
- **Mesotrione**: clovers = alfalfa > radish > hairy vetch > pea >>>>> grasses
- **Chlorimuron**: clovers = alfalfa > radish > hairy vetch > pea > sorghum > corn >>> cool season grasses
Herbicide selectivity and persistence demonstration – 2012/13

1 & 2 L bottles – Weed Spray System Equipment
Effect of decreasing Dual Mag rate on cover crop injury (ave. over two years)

\[ X = 1.67 \text{ pt} = 1.6 \text{ lb} \]

Half-life = 35 days
Effect of decreasing **Pursuit** rate on cover crop injury (ave. over two years)

Half-life = 75 days
Effect of decreasing Resolve rate on cover crop injury (ave. over two years)

- Forage radish
- Ryegrass
- Hairy vetch
- Crimson clover
- Oats

Half-life = 7 days
Carryover Injury to Subsequent Crops Depends On:

- Herbicide **persistence** in soil
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- Rotational crop **sensitivity/susceptibility**
  - How sensitive are rotational crops - legumes, radish/mustards, grasses

- Persistent herbicides that aren’t very active and short-lived herbicides that are very active don’t really matter
<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Active ingredient</th>
<th>Normal rate/acre</th>
<th>Half-life (days)</th>
<th>Cash crop restrictions</th>
<th>Fall cover crops</th>
<th>OK to plant</th>
<th>Concern for</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corn herbicides</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,4-D 4S</td>
<td>2,4-D</td>
<td>1–2 pt</td>
<td>7</td>
<td>Plant anything 30 days after application</td>
<td>All grasses</td>
<td>Wait 30 days before planting sensitive broadleaves</td>
<td>Amine formulations are more water soluble and can leach into seed zone</td>
<td></td>
</tr>
<tr>
<td>Accent 75DF/</td>
<td>nicosulfuron/</td>
<td>0.66 oz/</td>
<td>21</td>
<td>Sensitive crops have 10- to 18-month restriction</td>
<td>Fall cereal grains, ryegrass</td>
<td>Small-seeded legumes, mustards, sorghum</td>
<td>More persistent in high-pH soils (&gt; 7)</td>
<td></td>
</tr>
<tr>
<td>Steadfast 75DF</td>
<td>nicosulfuron + riminosulfuron</td>
<td>0.75 oz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atrazine 4L</td>
<td>atrazine</td>
<td>1–2 qt</td>
<td>30–60</td>
<td>Can plant corn, sorghum, and soybean the following year (some products allow others)</td>
<td>Sorghum species</td>
<td>Cereals, ryegrass, legumes, and mustards</td>
<td>More persistent in high-pH soils (&gt; 7); rates &lt; 1 lb/acre can allow more flexibility</td>
<td></td>
</tr>
<tr>
<td>Balance Pro 4L</td>
<td>isoxaflutole</td>
<td>3 fl oz</td>
<td>50–120</td>
<td>Small-seeded legumes and vegetables have 10- to 18-month restriction</td>
<td>Fall cereals grains</td>
<td>Cereals, ryegrass, legumes, and mustards</td>
<td>15 inches of cumulative precipitation required from application to planting rotation crops except soybean, barley, wheat, sorghum, and sunflower</td>
<td></td>
</tr>
<tr>
<td>Balance Flexx 2L</td>
<td>isoxaflutole</td>
<td>6 fl oz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Callisto</strong></td>
<td>mesotrione</td>
<td>3–6 fl oz</td>
<td>10–50</td>
<td>10 to 18 months for legumes and vegetables</td>
<td>All grasses</td>
<td>Small-seeded legumes, mustards</td>
<td>Sequential applications (PRE fb POST) increase the potential for injury</td>
<td></td>
</tr>
<tr>
<td>(includes Lumax, Lexar, Halex GT, etc.)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Capreno 3.45SC</td>
<td>Tembotrione + thiacarbazole</td>
<td>3 fl oz</td>
<td>15</td>
<td>4 months for wheat; 10 months for barley, sorghum, oats and alfalfa</td>
<td>Wheat, triticate, rye</td>
<td>Small-seeded legumes, mustards, sorghum</td>
<td>15 inches of cumulative precipitation required from application to planting rotation crops except wheat</td>
<td></td>
</tr>
<tr>
<td>Corvus 2.63SC</td>
<td>isoxaflutole + thiacarbazole</td>
<td>5.6 fl oz</td>
<td>50–120</td>
<td>4 months for wheat; 9 months for barley; and 17 months for alfalfa, oats, sorghum, and canola</td>
<td>Wheat, triticate, rye</td>
<td>Small-seeded legumes, mustards, sorghum</td>
<td>15–30 inches of cumulative precipitation from application to planting for sensitive crops</td>
<td></td>
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<tr>
<td>Harness 7E</td>
<td>acetochlor</td>
<td>2 pt</td>
<td>10–20</td>
<td>4 months for wheat; 9 months for alfalfa and clovers</td>
<td>Most crops should be fine</td>
<td>Food or feed residues rather than crop injury may be a concern</td>
<td>Nonfood/feed winter cover crops are allowed after corn harvest</td>
<td></td>
</tr>
<tr>
<td>(Degree, Warrant)</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Impact/Aembleon 2.8SC</td>
<td>topromesone</td>
<td>0.75 fl oz</td>
<td>14</td>
<td>Alfalfa, canola, soybean and sunflower have a 9-month restriction</td>
<td>Wheat, barley, oats, and rye are allowed after 3 months; ryegrass should also be OK</td>
<td>Although many broad-leaves are restricted, impact does not have much soil activity</td>
<td>We have not seen this herbicide carryover in PA</td>
<td></td>
</tr>
</tbody>
</table>
General guidelines

• Look at Half-Life Information

• Corn herbicides
  – Atrazine or simazine at < 1 lb/A can allow cereal grain establishment
    • < 0.75 lb/A may allow for most legume cover crops, mustards, and annual ryegrass.
  – Mesotrione (Callisto etc. is problematic for legumes and mustards like canola and forage radish.
  – Clopyralid (Stinger and a component of Hornet and SureStart) could also affect these small seeded broadleaves.

• Soybean herbicides
  – Chlorimuron (Classic, etc.), imazethapyr (Pursuit), and fomesafen (Reflex etc.) could be a problem for fall seeded legume or mustard covers - cereal grains OK.
General guidelines (cont.)

• Other corn and soybean herbicides and their impact on legumes or mustard species in particular is less clear.

• Wheat herbicides
  – Generally not a problem, except for companion or relay cropping - If you can double-crop soybean, should be OK

• Until more research is conducted assessing specific herbicide-cover crop interactions, the general guidelines provided in *Agronomy Guide Table 1.10-6* can be helpful.
Questions thus far?
Chemical Control of Cover Crops

• Can effectively kill most cover crops with herbicides
• Select the right product for the job
• Application timing can be important for the control of some cover crops
• Weather and environment can impact success
• Legumes may require special consideration
Primary Burndown Herbicides

• Glyphosate (Roundup) – Broadleaves and grasses
• Paraquat (Gramoxone) – Broadleaves and grasses
• Glufosinate (Liberty) – Broadleaves and grasses (limited utility)
• PGR’s - 2,4-D and Dicamba (Banvel) and maybe clopyralid (Stinger) – Broadleaves only
Common burndown herbicides

- Glyphosate @ 1.12 lb/Acre (32 fl oz Roundup PM)
- Glyphosate + 2,4-DLVE @ 1lb + 0.5lb (1 pt)
- Glyphosate + dicamba @ 1lb + 0.5lb (1 pt)
- Paraquat + metribuzin + NIS @ 0.75lb (3 pt) + 0.188lb (4 oz)
- Paraquat + metribuzin + 2,4-DLVE + NIS @ 0.75lb + 0.188lb + 0.5lb

*Often mixed with residual herbicides
Table 1. Effectiveness of herbicides for control of common cover crops (based on Penn State research or our best guess). Control ratings: 10 = 95-100%; 9 = 85-95%; 8 = 75-85%; 7 = 65-75%; 6 = 55-65%; and N = less than 55%.

<table>
<thead>
<tr>
<th>Rate* (lb/acre)</th>
<th>Annual ryegrass</th>
<th>Winter rye</th>
<th>Winter wheat</th>
<th>Crimson clover</th>
<th>Red clover</th>
<th>White clover</th>
<th>Hairy vetch</th>
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<tbody>
<tr>
<td>2,4-D ester</td>
<td>0.5</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>8+</td>
<td>8</td>
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<td></td>
<td>1.5</td>
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<td>9</td>
<td>9</td>
<td>8</td>
<td>7+</td>
<td>7</td>
</tr>
<tr>
<td>Glyphosate +2,4-D ester or +dicamba</td>
<td>0.75 + 0.5</td>
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<td>10</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>0.75 + 0.5</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>10</td>
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</tr>
<tr>
<td>Paraquat</td>
<td>0.5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>7</td>
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<tr>
<td></td>
<td>0.75</td>
<td>6</td>
<td>8</td>
<td>8+</td>
<td>8</td>
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<tr>
<td>Paraquat+ Atrazine or Metribuzin</td>
<td>0.5 + 1 or 0.25</td>
<td>7</td>
<td>8+</td>
<td>8+</td>
<td>9</td>
<td>8+</td>
<td>7</td>
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*0.75 lb Glyphosate = 32 fl. oz of a 41% glyphosate; 0.5 lb paraquat = 2 pt Gramoxone SL; Clopyralid is a component of Stinger, Hornet, and Surestart.
Potential burndown partners

• Corn
  – Atrazine
  – Balance/Corvus*
  – Metribuzin (Sencor)
  – Harmony & Harmony Extra
  – Hornet*
  – Lumax/Lexar*
  – Sharpen
  – Valor

• Soybean
  – Authority (several)
  – Canopy (EX, Envive)*
  – Metribuzin (Sencor)
  – Harmony & Harmony Extra
  – Pursuit (Extreme)*
  – Sharpen
  – Valor & Valor XLT*

*Check residual characteristics
Glyphosate

- Good on all cereal grains and most grasses
- Rates range from 0.375 – 1.5 lb ae/acre depending on species and growth stage
- Fair to good on many broadleaves
  - Weak on legumes
- Apply at 5 to 40 GPA (lower rate for low volume applications)
- Less mature annuals easier to control
- Tank-mixtures may reduce activity and require higher rates (particularly PSII-triazine herbicides)
Paraquat

- Currently sold as Gramoxone
- Apply 0.5 to 1.0 lb/acre (2 - 4 pt) based on weed size (1-6 inches)
- Apply in a minimum of 10 GPA water (general rule)
- Tank-mix with PSII (Group 5) herbicides to increase control (atrazine, metribuzin, etc.)
- Use flat fan nozzle tips
- Include appropriate surfactant (NIS or COC)
- Do not spray in suspension-type fertilizers
- “For grass cover crops, apply prior to tillering or after boot stage. Treatments made between tillering and boot stage may not provide complete control”
Gramoxone, April 17 application

Photo taken May 18, 2009
Glyphosate vs. Gramoxone/metribuzin applied April 17
Photo taken on April 26, 2009
Rye Control in Soybean (Rock Springs)

Rated on 6/3/09
LSD = 4

17-Apr
27-Apr
7-May
PGR Herbicides

- 2,4-D, dicamba, and clopyralid
  - Banvel, Clarity, Status (dicamba)
  - Hornet, Stinger, Surestart, TripleFlexx (clopyralid)
- Often necessary for effective legume control
  - 2,4-D not effective on Red and White Clover
- Vapor and particle drift can be a concern
- Cash crop injury also a consideration
- Soil residues (clopyralid) can limit cash crop options – esp. for veggies, legumes, etc.
No-till Corn about 2 WAA
Hairy vetch control in no-till corn (all four locations)
Annual Ryegrass (*Lolium multiflorum*) Cover Crop
Annual ryegrass control

- Annual or Italian ryegrass – diverse genetics
- Winter or summer annual
- Excellent cover crop, but can be difficult to control in no-till burndown and in winter cereal grains
- Can be glyphosate tolerant
- Cool spring weather reduces control
- Mix cultivars make it more challenging
- ACCase (Group 1), ALS (Group 2), and glyphosate (Group 9) resistant biotypes found in the US
Rye grass control experiment - 2008

- Drill seeded annual ryegrass at two locations, fall 2007
- Unknown cultivars
- Applied control treatments prior to no-till corn in 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Size</th>
<th>Air temperature</th>
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<tbody>
<tr>
<td>Rock Springs</td>
<td>5/1/08</td>
<td>5-10 inches</td>
<td>38/53 F</td>
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<tr>
<td>Landisville</td>
<td>5/5/08</td>
<td>6-14 inches</td>
<td>37/71 F</td>
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</tbody>
</table>
Annual ryegrass control in corn about 6 weeks after application - 2008

Application in early May
Annual ryegrass control

- Attention to detail is very important with ARG
- Consider weather, growth stage, tank-mixes, etc.
- Probable reasons for failure: ryegrass mixtures and not single cultivars, inappropriate tank-mixes, insufficient glyphosate rates, poor spray coverage
- Recognize that there are resistant weedy biotypes
- Plant only reputable “varieties” from established seed companies; “not junk cheap seed” – quote from Hulting
  - In Oregon, no documented resistance in production fields dedicated to seed production
Annual Ryegrass as a Cover Crop in Midwest Corn and Soybean Production

2014 Management Recommendations

Mike Plumer, Agronomist and Cover Crop Specialist, Illinois
Mark Melbye, Agronomist, Oregon Seed Industry
Dan Towery, Conservation Cropping Systems Specialist, Indiana
Andy Hulting, Weed Scientist, Oregon State University

Annual ryegrass is a vigorous cool-season grass with an extensive root system. As a cover crop, annual ryegrass helps prevent erosion, builds soil organic matter, improves soil tilth, captures residual nitrogen, and can significantly increase the rooting depth of corn and soybeans. This guide covers the management practices essential to growing a successful annual ryegrass cover crop - time-tested strategies from more than 12 years of on-farm testing in the Midwest.

Using annual ryegrass as a cover crop requires proper management. It must be seeded in a timely manner, at the proper rates, and it must be controlled on time so that it does not compete with corn or soybeans.

When to Seed Annual Ryegrass

Seeding date is an extremely important factor to ensure establishment and growth of annual ryegrass before winter. Annual ryegrass establishes and grows rapidly when late summer temperatures exceed 55°F, but it is slower to establish than winter wheat or cereal rye when soil and air temperatures are cooler in late-September and October. Annual ryegrass may need to be seeded aerially or with a high clearance seeder before harvest in order to be timely. If ryegrass is seeded after harvesting corn and soybeans, do so as soon as possible.
Planting Green

- Planting Green is a term used for the practice of planting crops into actively growing cover crop in a no-till system.
- Allows for maximum above and below ground biomass.
  - Higher C:N ratio covers will persist longer.
- Can help manage excess spring soil moisture (kill early in dry years).
- May reduce certain pest problems (e.g. slugs).
- Can require specialized planting equipment.
  - Farmers adjust cover crop seeding rates to avoid too much residue (0.5 to 1 bu/acre).
- Want high turgor cover crops to enable slicing with coulters/disk openers.
Photo taken May 18, 2009

April 17
12 inches

April 26
20 inches

May 7
36 inches
Establishing Cash Crops into Heavy Residue

• Typical no-till equipment may not handle this much residue.
• Difficult to slice through the heavy residue and seed placement and lack of seed furrow closure can be problematic.
• Poor seed to soil contact reduced corn and soybean populations in some locations and years.
• We have continued to tweak our planting equipment every season.
ZRX – zone till - developed by Charles Martin, PA farmer and now being sold by Dawn Equipment
Special Considerations for Planting Green

- Glyphosate – cover seed and use Roundup Ready if crop emerging
- Paraquat – cover seed and apply before crop emergence
- PGR herbicides - Some injury potential – timing important
- Other herbicides – Product specific – could be preplant or crop emergence issues
2,4-D burndown - Corn

- **Preplant** – Planting of corn must be delayed a minimum of 7 days after application at rates up to 1 pt and 14 days at rates from 1 to 2 pts. Planting sooner may result in unacceptable crop injury.

- **PRE** – Apply after corn is planted but before emergence. Seed furrow must be completely closed at application or severe crop injury may result.
2,4-D Burndown - Soybeans

• May use 1 pt/acre (0.5 lb) of 2,4-D ester at least 7 days ahead of soybean planting

• Greater than 1 pt/acre should be applied at least 30 days before planting
  – except E-99, Salvo, and Weedone 650 that allow 15 days @ 1 lb
Dicamba (Clarity or Banvel) burndown - Corn

• Direct contact of Clarity with corn seed must be avoided. If corn seeds are less than 1.5 inches below the soil surface, delay application until corn has emerged.

• Preplant and PRE – Apply 16 fl oz on medium or fine-textured soils with 2.5% or greater OM. Use 8 fl oz on soils with less than 2.5% OM

• In reduced till, do not apply PRE to soils with less than 2.5% OM until after corn emergence
Planting Green in Corn - 2,4-D and Dicamba Takehome

• Make sure seeds are planted ≥ 1.5 inches and are well covered
• Delay application until after seeds have germinated, but prior to emergence (spike OK)
• Better to apply later than earlier unless you apply 7 days ahead of planting
Thank you... QUESTIONS?