Cover Crops Management --terminating

Mike Plumer
Conservation Agriculture
Seed source

• Many different varieties of each cover crop
• Major development being done on varieties

• VNS— means variety not stated
  – You have no idea what is in the bag
• Use tested varieties in your area
• Know your seed dealer if they have experience
Cover crops
Be able to spray when needed!!

• Be ready to spray no matter what conditions
• Target cover crop growth stage to meet your needs
  – Nitrogen
  – Root growth
  – Weed control
• Consider multiple herbicide applications
  – Not always need, but be prepared
• Consider non glyphosate control options
# Cover Crop Control

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>Control Methodology</th>
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</thead>
<tbody>
<tr>
<td>Radish</td>
<td>Winter kills</td>
</tr>
<tr>
<td>Cereal rye</td>
<td>glyphosate, Gramoxone, corn herbicides</td>
</tr>
<tr>
<td>Hairy vetch</td>
<td>2,4-D; no glyphosate!</td>
</tr>
<tr>
<td>Annual ryegrass</td>
<td>glyphosate, done correctly, 2x Gramoxone Axiom, BasisBlendQ, SteadfastQ</td>
</tr>
<tr>
<td>Crimson clover</td>
<td>glyphosate, 2,4-D</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>glyphosate, 2,4-D; dicamba, corn herbicides</td>
</tr>
<tr>
<td>Spring oats</td>
<td>winter kills</td>
</tr>
<tr>
<td>Triticale</td>
<td>same as cereal rye</td>
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</tbody>
</table>
Brassica control

- Sulfonylurea—chlorimuron, nicosulfuron
- Imidazolinone—Pursuit
- Triazines—atrazine
- Phenoxy—2,4-D
- Substituted Ureas—linuron, Lorox
- Bentazon—Basagran
Herbicide Carry over Issues

• Brassicas very sensitive
  – Classic, Pursuit, Scepter, and mixes like Canopy with chlorimuron
  – Little guidance on labels need at least 60 days

• Late post application may kill all cover crops
  – Including grasses, legumes
Rapeseed

• Varieties being developed for increased effects
  – Essex is currently preferred variety
  – Excellent on soybean cyst nematode, significantly reduces SDS and other diseases

• Narrow seeding window for winter hardiness
  – September 10-20 for this area

• Seeding rate 5-10#/a

• Controlled by 2,4-D, glyphosate, or corn herbicides
Radish- which one do you want
Crimson Clover and pea control

• In full bloom stage, easy to control with tillage or crimping or close mowing

• Vegetative control
  – Glyphosate + 2,4-D
  – Gramoxone + 2,4-D+ atrazine, corn herbicides
  – Dicamba, or mixed with corn herbicides
Winter pea, Austrian winter pea easily controlled
Annual ryegrass with vetch top and crimson clover 5 days after herbicide application. 3pts glyphosate (1.25#ai/a) plus 1 qt 2,4-D
Vetch

• Hairy, woolypod vetch
  – 2,4-D excellent control
  – Glyphosate---NO control, been used to clean weeds out of vetch
  – Gramoxone, corn herbicides + 2,4-D
  – Crimping only at full bloom and heavy crimper

• Common vetch—not winter hardy

• Chickling vetch not winter hardy most years
  – Use 2,4-D

• Will have hard seed to germinate for 5-20 years
Right stage to crimp
Plant first then crimp
Cereal rye, wheat, triticale control

• Fairly easy
  – Glyphosate (.75#/a) 1 qt. 41%
  – Gramoxone + atrazine mix (corn herbicides)
  – Crimping/mowing at pollination
Rye at pollination, only time to get good control by crimping—ave. 95+%
Drilling and crimped
Or crimped and drilled?
Rye, ryegrass, or annual ryegrass

• Most don’t know the difference
• Rye is a cereal grain crop
• Ryegrass is a forage grass that may be perennial, biennial like or a winter annual
• Early maturing diploid annual ryegrass is what is used for a cover crop
Species

- Cereal rye— *Secale cereale*
- Perennial ryegrass—*Lolium perenne*
- Annual ryegrass—*Lolium multiflorum*
Difference in maturity of 2 annual ryegrass varieties
Adjust herbicide rate and selection to compensate
Annual ryegrass is 7-9 months old April 1
With extensive root system

Variety also determines Size, condition, uptake

Treat it like an established Forage grass
Spring Management

• **Annual ryegrass is easiest to kill pre-joint**
  – Jointing occurs at 6-10” in height
  – Warm weather greatly increases control
    (herbicide can translocate)
  – Date varies with location and season

• **Early control**
  – maximizes nitrogen release and decomposition rate
  – makes easier planting, conserves moisture
Plant growth stage Issues

• Most difficult to control at reproductive stage
  – at boot development to emergence
  – Easier after head emergence, BUT may produce viable seed

• Grasses tend to be more difficult after 2\textsuperscript{nd} joint to heading;
  – Just requires doing it right...
Controlling annual ryegrass
What we have learned

• Systemic herbicides are VERY temperature sensitive
  – Plant must be actively growing to work
  – Annual ryegrass does not translocate when temperatures are <40 and/or weather is cloudy

• Glyphosate products require translocation for over 4 hours before sunset after application Which means no spraying after 2pm in cold weather
What YOU should DO !!

• AMS– no substitute products
  – Agitate several minutes
• Use 10 gallons water/acre
• Use medium to fine spray droplet nozzles
• Spray only in mornings in cold weather
  – Stop 4-5 hours before sunset
• Try to spray on sunny days if cold
• If cold do Double Shot treatment
  – Burndown followed by 2nd treatment 2 weeks later
    • Gramoxone, followed by glyphosate, or post grass herbicide
    • Glyphosate, followed by grass herbicide or another burndown
    • Gramoxone, followed by Gramoxone and residual herbicides
Not all herbicides work well to kill cover crops in cool weather
19 varieties, different herbicides----576 plots
% control Sprayed April 16, 2007, all varieties jointed, rating 30 days after spraying
Ryegrass Herbicide Control

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Concentration</th>
<th>Efficiency</th>
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</thead>
<tbody>
<tr>
<td>Gramoxone Inteon</td>
<td>3 pt</td>
<td>78%</td>
</tr>
<tr>
<td>Gramoxone Int / Aatrex / Princep</td>
<td>3 pt/2 qt/1 qt</td>
<td>85%</td>
</tr>
<tr>
<td>Round-up W.MAX</td>
<td>22 oz</td>
<td>98%</td>
</tr>
<tr>
<td>Round-up W.MAX / Degree Xtra</td>
<td>22 oz/3 qt</td>
<td>86%</td>
</tr>
<tr>
<td>Steadfast</td>
<td>.75 oz</td>
<td>47%</td>
</tr>
<tr>
<td>ClearOut 41 plus</td>
<td>1 qt</td>
<td>93%</td>
</tr>
<tr>
<td>ClearOut 41 plus</td>
<td>1.5 qt</td>
<td>98%</td>
</tr>
<tr>
<td>ClearOut 41 plus / Basis</td>
<td>1.5 qt/.33 oz</td>
<td>98%</td>
</tr>
</tbody>
</table>

R.Hines, M.Plumer
Annual Ryegrass
Herbicide trial

treatment

gly51 22oz 97

gly 51 32oz + 2,4-D 16oz 99

gly 51 32oz + calisto 7oz 63

gly51 32oz + Prowl H2O 3 pt 99

gly51 32oz + resolve 2 oz. 99

gly51 32 oz + Basis 1 oz 99

gly51 32oz + Balance Pro 4oz 99

gly 51 32 oz 99

Control at 36 das

LSD 0.05 0.6

Sprayed at 1st to 2nd joint stage, mid April, 6 reps
### Herbicide trial-vegetative growth

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Out 41+</td>
<td>3 pt./a</td>
<td>98</td>
</tr>
<tr>
<td>Weather Max</td>
<td>32oz./a</td>
<td>98</td>
</tr>
<tr>
<td>W.Max+ Degree Xtra</td>
<td>22 oz</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>3 qt./a</td>
<td></td>
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<tr>
<td>Gramoxone Inteon</td>
<td>3pts/a</td>
<td>78</td>
</tr>
<tr>
<td>Clear Out 41+ Basis</td>
<td>3pts</td>
<td>98</td>
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<tr>
<td></td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Gramone Inteon Atrazine+simazine</td>
<td>3pts/a</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>2qt+ 1qt</td>
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</tbody>
</table>
Time of day glyphosate

Temperatures 60 day and 40 night
3 replications

WeatherMax

Wm + citric acid + ammonium sulfate

Plumer, U of IL
### Annual Ryegrass at boot stage of growth—note maturity difference of varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Gramoxone 48 oz</th>
<th>Liberty 32 oz</th>
<th>Power Max 40 oz</th>
<th>PowerMax Sharpen</th>
<th>PowerMax Corvus</th>
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</thead>
<tbody>
<tr>
<td>Gulf</td>
<td>90</td>
<td>15</td>
<td>98</td>
<td>95</td>
<td>99</td>
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<tr>
<td>King</td>
<td>50</td>
<td>15</td>
<td>98</td>
<td>98</td>
<td>95</td>
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<tr>
<td>KB Royal</td>
<td>70</td>
<td>10</td>
<td>98</td>
<td>95</td>
<td>95</td>
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<tr>
<td>Marshall</td>
<td>45</td>
<td>10</td>
<td>98</td>
<td>98</td>
<td>95</td>
</tr>
<tr>
<td>Bounty</td>
<td>80</td>
<td>10</td>
<td>99</td>
<td>98</td>
<td>98</td>
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</tbody>
</table>

Plumer, 2012  rating 45 DAS
<table>
<thead>
<tr>
<th>Trt No.</th>
<th>Treatment No.</th>
<th>Form Conc Type Rate</th>
<th>Rate Unit</th>
<th>Other Rate Unit</th>
<th>Growth Stage</th>
<th>Appl Code</th>
<th>LOLMG Root Max 5-15-13</th>
<th>LOLMG Tantbo 5-15-13</th>
<th>LOLMG Maximus 5-15-13</th>
<th>LOLMG Bounty 5-15-13</th>
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</thead>
<tbody>
<tr>
<td>1 NONTREATED</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 d</td>
<td>0 g</td>
<td>0 f</td>
<td>0 g</td>
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<tr>
<td>2 ROUNDP POWERMAX NIS (ACTIVATOR 90)</td>
<td>4.5 SL</td>
<td>1 lb ae/a</td>
<td>28.4 fl oz/a</td>
<td>1 NODE A</td>
<td>AMS</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>100 SG</td>
</tr>
<tr>
<td></td>
<td>NIS (ACTIVATOR 90)</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>1 NODE A</td>
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<tr>
<td>3 ROUNDP POWERMAX NIS (ACTIVATOR 90)</td>
<td>4.5 SL</td>
<td>1.25 lb ae/a</td>
<td>35.6 fl oz/a</td>
<td>1 NODE A</td>
<td>AMS</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>100 SG</td>
</tr>
<tr>
<td></td>
<td>NIS (ACTIVATOR 90)</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>1 NODE A</td>
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<tr>
<td>4 ROUNDP POWERMAX NIS (ACTIVATOR 90)</td>
<td>4.5 SL</td>
<td>1.5 lb ae/a</td>
<td>42.7 fl oz/a</td>
<td>1 NODE A</td>
<td>AMS</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>100 SG</td>
</tr>
<tr>
<td></td>
<td>NIS (ACTIVATOR 90)</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>1 NODE A</td>
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<tr>
<td>5 ROUNDP POWERMAX NIS (ACTIVATOR 90)</td>
<td>4.5 SL</td>
<td>2 lb ae/a</td>
<td>57 fl oz/a</td>
<td>1 NODE A</td>
<td>AMS</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>100 SG</td>
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<tr>
<td></td>
<td>NIS (ACTIVATOR 90)</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>1 NODE A</td>
<td></td>
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<tr>
<td>6 ROUNDP POWERMAX GRAMOXONE INTEON NIS (ACTIVATOR 90)</td>
<td>4.5 SL</td>
<td>1.25 lb ae/a</td>
<td>35.6 fl oz/a</td>
<td>1 NODE A</td>
<td>AMS</td>
<td>2 SL</td>
<td>0.25 lb ai/a</td>
<td>16 fl oz/a</td>
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<td>NIS (ACTIVATOR 90)</td>
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<td>1 NODE A</td>
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<tr>
<td>7 ROUNDP POWERMAX RAGE D-TECH NIS (ACTIVATOR 90)</td>
<td>4.06 EC</td>
<td>0.38 lb ai/a</td>
<td>12 fl oz/a</td>
<td>1 NODE A</td>
<td>AMS</td>
<td>100 SL</td>
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<td>0.25 % v/v</td>
<td>8.5 lb/100 gal</td>
<td>100 SG</td>
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<td>NIS (ACTIVATOR 90)</td>
<td>100 SL</td>
<td>0.25 % v/v</td>
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<td>8 ROUNDP POWERMAX GOAL 2XL NIS (ACTIVATOR 90)</td>
<td>4.5 SL</td>
<td>1.25 lb ae/a</td>
<td>35.6 fl oz/a</td>
<td>1 NODE A</td>
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<td>2 EC</td>
<td>0.047 lb ai/a</td>
<td>3 fl oz/a</td>
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<td>1 NODE A</td>
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<td>Treatment No. Name</td>
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<td>Other Other Rate Unit</td>
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<tr>
<td>15 GRAMOXONE INTEON</td>
<td>2 SL 0.75 lb ai/a</td>
<td>48 fl oz/a</td>
<td>1NODE A</td>
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<tr>
<td>NIS (ACTIVATOR 90)</td>
<td>100 SL 0.25 % v/v</td>
<td>20 fl oz/a</td>
<td>10DA-A-B</td>
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<tr>
<td>SELECT MAX</td>
<td>0.97 EC 0.152 lb ai/a</td>
<td>20 fl oz/a</td>
<td>10DA-A-B</td>
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<tr>
<td>MSO (MSO ULTRA)</td>
<td>100 SL 0.5 % v/v</td>
<td>25 fl oz/a</td>
<td>10DA-A-B</td>
<td></td>
<td></td>
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<tr>
<td>32% UAN</td>
<td>100 SL 0.5 % v/v</td>
<td>25 fl oz/a</td>
<td>10DA-A-B</td>
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Double Shot tmt
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What to mix?

• NEVER mix atrazine or calisto reduces control by 30-50%

• Can mix these herbicides;
  – Basis BlendQ
  – Resolve Q
  – 2,4-D
  – Princep
  – Sharpen  -NO --too much damage stops translocation
  – Corvus –still in trials
HOW to **FAIL** in Ryegrass Control

• Spray in afternoon with cold or cloudy weather
• Use AI nozzles with coarse droplets
• Use AMS substitute product
• Use 15-20 gallons of water per acre
• Dump glyphosate in before AMS
• Mix other herbicides with glyphosate
Fixing a poor spray job in cold weather

• Don’t respray glyphosate?
  – Damaged plant may not translocate

• Full rate of Gramoxone in 30 gallon water

• Followup spray in 2-3 weeks when weather is warmer
What to mix?

• NEVER mix atrazine or calisto
• Can mix these herbicides;
  – Basis Blend
  – Resolve Q
  – 2,4-D
  – Princep
Control of ryegrass in Wheat

• Glyphosate or Gramoxone burn down before planting
  – Axiom before 2 leaves

• PowerFlex or Osprey in early spring
More information

www.ryegrasscovercrop.com

www.mccc.msu.edu