Cover Crops
Paul Brown – Kings and Frontier
Cover Crops.

The plan --

• What are they.
• What chiefly do they do.
• Types.
• Termination.
What is a Cover crop?
We need to avoid this loss.
Cover crops can be valuable in 4 key ways

1. Capture a proportion of remaining nutrients and prevent leaching.
2. Improve soil structure and vitality and allow cheaper cultivations.
3. Reduce weeds and some soil pests.
4. Improve yields.
Green cover crops - overview

• Huge interest across the UK
• A lot of interest at Open days and 25% + this autumn.
• Appealing to growers with a wide range of rotations and soil types.
• Whole host of benefits – some will suit every farm
  – EFA’s
  – Soil health – desire to increase Soil Organic matter.
  – Direct drilling / Min till
  – Soil and Nutrient capture -- water companies
  – Introduction / extension of spring cropping
  – Nematode and other soil pest reduction
  – Part of a Blackgrass reduction strategy.
Frontier Trial Sites
Nitrogen **loss** over Winter 2013/14
Average 73 kg N/ha lost Sept–Feb

<table>
<thead>
<tr>
<th>Frontier site</th>
<th>Location</th>
<th>N loss Kg N /ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ormskirk</td>
<td>LANCS</td>
<td>98</td>
</tr>
<tr>
<td>Gressenhall</td>
<td>NORFOLK</td>
<td>62</td>
</tr>
<tr>
<td>Walsham</td>
<td>SUFFOLK</td>
<td>74</td>
</tr>
<tr>
<td>Birch</td>
<td>ESSEX</td>
<td>47</td>
</tr>
<tr>
<td>Wrotham</td>
<td>KENT</td>
<td>60</td>
</tr>
<tr>
<td>Malshanger</td>
<td>HANTS</td>
<td>42</td>
</tr>
<tr>
<td>Blandford</td>
<td>DORSET</td>
<td>130</td>
</tr>
</tbody>
</table>
Results from 33 fields monitored between 2008 & 2014:----
59% reduction in leaching from growing a cover crop compared to over-winter stubble.
<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>DM Yield Ton /ha</th>
<th>N capture Kg N ha</th>
<th>P capture Kg P ha</th>
<th>K capture Kg K ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye /Vetch</td>
<td>2.3</td>
<td>59</td>
<td>9</td>
<td>51</td>
</tr>
<tr>
<td>Radish /Oat Baracuda</td>
<td>3.2</td>
<td>130</td>
<td>16</td>
<td>85</td>
</tr>
<tr>
<td>Radish Defender</td>
<td>4.1</td>
<td>170</td>
<td>21</td>
<td>114</td>
</tr>
<tr>
<td>Mustard /Oat</td>
<td>2.1</td>
<td>67</td>
<td>8</td>
<td>54</td>
</tr>
</tbody>
</table>
Brassica Cover crop roots

Radish A -  Radish B -  Mustard -  Turnip rape
The 3 essential components.
What does each bring to a grower--

• Cereal --
  – Fast growth        -- Shallow root – tilth maker
  – Easy to destroy    -- Cheap
  – Disease            -- Pests
  – Soil health improvement

• Brassica –
  – Very Fast growth    -- Deep roots
  – Considerable N catch -- Soil structuring
  – Drainage            -- Disease
  – Pest reduction

• Others –
  – Range of species /types  -- Range of rooting
  – Range of food supply to the soil --N fixation
EFA - Catch and Cover crops.

- Both need to be –
- A sown mix of at least 2 species from list—
  - At least 1 cereal –
    - Rye, Oats, Barley –only
  - At least 1 Non cereal –
    - Vetch, Phacelia, Mustard, Oil Radish, Lucerne

- Catch crops –sown by 31\textsuperscript{st} August -- left until 1\textsuperscript{st} October

- Cover Crops –sown by 1\textsuperscript{st} October – left until 15\textsuperscript{th} Jan 2017

- After EFA period can be grazed or destroyed
Working with Specialist Brassica breeders -- late drilled
Same varieties – early drilled
What is being used:

- Mixtures: 62%
- Radish alone: 26%
- Vetch: 3%
- Mustard: 3%
- Berseem clover: 2%
- Others: 4%

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- Oat/Radish mix: 27%
- Soil structure mix: 25% (Tillage radish / Oil Radish / Cereal x2)
- Rye/Vetch: 20%
- Soil Vitality mix: 11% (Radish/Legume/Phacelia/Cereal x 3)
- BioFumigation mix: 8% (Brassica mix x 3)
- Oat/Mustard: 6% (3% Others)
Radish / Oat mix

- EFA suitable
- A choice of Radish
- Great nitrogen catch
Kings Rye/vetch mix
(or Oat /vetch mix)  20th October
Kings Soil Structure Mix
Radish x 2 / oat x 2 / forage rye / phacelia
Oil Radish
20th October -- 9 weeks
Radish –20 days.
“The power of the roots”
A range of Radish varieties.

<table>
<thead>
<tr>
<th></th>
<th>Siletina</th>
<th>Colonel</th>
<th>Siletta Nova NEW</th>
<th>Dacapo</th>
<th>Defender</th>
<th>Baracuda NEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not BCN</td>
<td>BCN 1</td>
<td>Not BCN</td>
<td>BCN 2 Multi res.</td>
<td>BCN 2</td>
<td>BCN 2</td>
<td></td>
</tr>
<tr>
<td>Key for BCN</td>
<td>Key for BCN</td>
<td>Late flower</td>
<td>Safe in a Beet rotation</td>
<td>Not just BCN Bio-Fum.</td>
<td>BCN 2 Fast growth /fast soil cover</td>
<td></td>
</tr>
<tr>
<td>German rec. List Flowering</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1=late 9=ear</td>
<td>65</td>
<td>66</td>
<td>72</td>
<td>74</td>
<td>76</td>
<td>78</td>
</tr>
<tr>
<td>Days to Flower</td>
<td>55</td>
<td>66</td>
<td>72</td>
<td>74</td>
<td>76</td>
<td>78</td>
</tr>
<tr>
<td>Probability August 15th sow</td>
<td>80%</td>
<td>63%</td>
<td>30%</td>
<td>30%</td>
<td>18%</td>
<td>15%</td>
</tr>
<tr>
<td>£ kilo</td>
<td>2.05</td>
<td>2.50</td>
<td>2.10</td>
<td>2.35</td>
<td>3.20</td>
<td>2.35</td>
</tr>
</tbody>
</table>
Crop Termination
Influences the weed issue

Cover crop type / Geography / Soil type

Current favourite = Glyphosate

- Flail and incorporate.
- Incorporate alone.
- Graze with livestock.
- Crimper roll.
- Frost.
- Other Herbicides.
Cover crop termination—Needs careful thought.
Cover crop mixture
November - Planted 4th Sept
Glyphosate – 10\textsuperscript{th} Feb
4 weeks later = 15\textsuperscript{th} March
Direct drill spring barley
15th March into the cover crop
8th May
Harvest = 9.28 ton/ha
Front Flail and Plough.
Grazing opportunity --
Wheat direct drilled into Cover crop
Thank you