PRODUCTIVE EFA – UNDERSWORN SPRING BARLEY TRIAL
Angus Monitor Farm

Introduction/Objectives

• With the need to meet Ecological Focus Area (EFA) rules to receive the Greening element of BPS, the group wished to look at catch crops as an alternative to fallow
• Fallow was seen as a waste of land and with an increasing ewe flock on the farm there was a need for extra clean grazing for livestock later in the year
• Catch crops of undersown spring barley had been used in the past to meet the EFA requirements but there was a difficulty of getting a good grass establishment without having a detrimental effect on the spring barley yield
• This trial was set up to look at different type of grass and sowing rates to determine the optimum conditions to get a good spring barley crop and have the benefit of clean grazing in the autumn.
• In doing this, it was felt that the EFA rules could be used to bring extra production to the farm

Field Details

• Previous crop was potatoes
• Lime
  o See Figure 1
  o Field was tested by GPS and lime applied to target of 6.2
  o 36t of calcium lime applied at an average rate of 3.3t/ha
• Nutrient Status
  o Phosphate Status = Medium –
  o Potash Status = Medium –
  o Magnesium Status = Medium +
• Concerto spring barley sown on 08/04/2017 at 215kg/ha

Establishment

• The field was ploughed in the spring, then the barley was sown using the farm’s one pass drill.
• All the grasses were sown using a grass harrow and applicator within days of the spring barley being sown.
Figure 1 pH as at March 2017

Spray Programme

- **T1 – 27/05/2017**
  - Headland Charge @ 1.5L/ha £9.25/ha
  - Butryflow @ 0.5L/ha £11.30/ha
  - Helix @ 0.4L/ha £15.88/ha
- **T2 – 19/06/17**
  - Master Magnesium @ 2.0kg/ha £5.00/ha
  - Credo @ 1.0L/ha £21.88/ha
  - Ruberic @ 0.50L/ha £7.25/ha

Fertiliser Programme

<table>
<thead>
<tr>
<th>Date</th>
<th>Product</th>
<th>Rate (kg/ha)</th>
<th>N Applied (kg/ha)</th>
<th>P Applied (kg/ha)</th>
<th>K Applied (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/04/2017</td>
<td>16.16.16+7.5S</td>
<td>370</td>
<td>59</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>12/05/2017</td>
<td>Urea 46N</td>
<td>150</td>
<td>69</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>128</strong></td>
<td><strong>59</strong></td>
<td><strong>59</strong></td>
<td><strong>59</strong></td>
</tr>
</tbody>
</table>
### Trial Layout

<table>
<thead>
<tr>
<th>Zone 8</th>
<th>Zone 7</th>
<th>Zone 6</th>
<th>Zone 5</th>
<th>Zone 4</th>
<th>Zone 3</th>
<th>Zone 2</th>
<th>Zone 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Comer</td>
<td>Donata</td>
<td>Eurostar</td>
<td>AberWolf</td>
<td>Meribel</td>
<td>Meribel</td>
<td>Meribel</td>
</tr>
<tr>
<td>Timothy</td>
<td>Cocksfoot</td>
<td>Perennial Ryegrass (Tetraploid)</td>
<td>Perennial Ryegrass</td>
<td>Italian Ryegrass</td>
<td>Italian Ryegrass</td>
<td>Italian Ryegrass</td>
<td></td>
</tr>
<tr>
<td>5.6kg/ha</td>
<td>5.6kg/ha</td>
<td>5.6kg/ha</td>
<td>5.6kg/ha</td>
<td>5.6kg/ha</td>
<td>8.4kg/ha</td>
<td>11.2kg/ha</td>
<td></td>
</tr>
</tbody>
</table>

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**Figure 2 Trial Layout**

**Varieties**

**Comer**
Timothy
Limagrain UK

- Good yields under both cutting and grazing management.
- Good early spring growth under grazing and good ground cover.
- On SRUC Grass Recommended List
- Cost £3.80kg = £21.28/ha

**Donata**
Cocksfoot
DLF

- Highly digestible
- Non-aggressive cocksfoot
- Late type
- Fits into mixes with perennial ryegrass, hybrid ryegrass, white clover and even Lucerne.
- Not on SRUC Grass Recommended List
- Cost £4.40kg = £24.64/ha
**Eurostar**  
Perennial Ryegrass (Intermediate Tetraploid)  
DLF/Limagrain  
- Particularly well suited to cutting with two good cuts of excellent D-value  
- Good seasonal distribution of growth  
- On SRUC Grass Recommended List  
- Cost £3.80kg = £21.28/ha

**AberWolf**  
Perennial Ryegrass (Intermediate Diploid)  
Germinal  
- Good yields under cutting  
- Very good yields under grazing throughout the season coupled with good grazing quality  
- On SRUC Grass Recommended List  
- Cost £4.20kg = £16.80/ha

**Meribel**  
Italian Ryegrass  
Limagrain  
- High yielding in first and second harvest years, with very good late summer and autumn growth  
- Good D-values  
- Very good ground cover, but may be prone to winter damage.  
- On SRUC Grass Recommended List  
- Cost £2.85kg  
  - 5.6kg/ha = £15.96/ha  
  - 8.4kg/ha = £23.94/ha  
  - 11.2kg/ha = £31.92/ha
Yield data of SB

There are obvious edge effects from the yield data as can be seen in the figure 3. However, if a 24m area around the field is removed, then the edge effect of the headlands are removed. Figure 4 shows the field split into the 8 different treatment zones with the 24m headland removed.

Figure 3 Field Yield data

Figure 4 Field Treatment Zones
Figure 5 below summarises the data from the yield map in Figure 3.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Minimum Yield (t/ha)</th>
<th>Maximum Yield (t/ha)</th>
<th>Range (t/ha)</th>
<th>Average Yield (t/ha)</th>
<th>Yield Difference from Control (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.39</td>
<td>9.90</td>
<td>3.51</td>
<td>7.94</td>
<td>-0.86</td>
</tr>
<tr>
<td>2</td>
<td>6.35</td>
<td>9.73</td>
<td>3.37</td>
<td>7.86</td>
<td>-0.94</td>
</tr>
<tr>
<td>3</td>
<td>6.46</td>
<td>9.90</td>
<td>3.44</td>
<td>8.05</td>
<td>-0.75</td>
</tr>
<tr>
<td>4</td>
<td>6.54</td>
<td>9.88</td>
<td>3.34</td>
<td>8.47</td>
<td>-0.33</td>
</tr>
<tr>
<td>5</td>
<td>6.60</td>
<td>9.87</td>
<td>3.27</td>
<td>8.59</td>
<td>-0.21</td>
</tr>
<tr>
<td>6</td>
<td>6.37</td>
<td>9.87</td>
<td>3.50</td>
<td>8.80</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>6.55</td>
<td>9.84</td>
<td>3.29</td>
<td>8.85</td>
<td>+0.05</td>
</tr>
<tr>
<td>8</td>
<td>6.45</td>
<td>9.85</td>
<td>3.40</td>
<td>8.80</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 5 Summary of Yield Data

**Costing**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Yield Difference from Control (t/ha)</th>
<th>Estimated Yield Reduction of straw (t/ha)</th>
<th>Financial Reduction from Treatment* (£/ha)</th>
<th>Cost of Treatment** (£/ha)</th>
<th>Total Cost (£/ha)</th>
<th>No of sheep grazing for 1 week @ £0.45/hd/wk to equate to total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.86</td>
<td>-0.43</td>
<td>163</td>
<td>57.42</td>
<td>220.42</td>
<td>489</td>
</tr>
<tr>
<td>2</td>
<td>-0.94</td>
<td>-0.47</td>
<td>179</td>
<td>49.44</td>
<td>228.44</td>
<td>507</td>
</tr>
<tr>
<td>3</td>
<td>-0.75</td>
<td>-0.38</td>
<td>143</td>
<td>41.46</td>
<td>184.46</td>
<td>388</td>
</tr>
<tr>
<td>4</td>
<td>-0.33</td>
<td>-0.16</td>
<td>59</td>
<td>42.30</td>
<td>101.30</td>
<td>225</td>
</tr>
<tr>
<td>5</td>
<td>-0.21</td>
<td>-0.11</td>
<td>41</td>
<td>46.78</td>
<td>87.78</td>
<td>195</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50.14</td>
<td>50.14</td>
<td>111</td>
</tr>
<tr>
<td>7</td>
<td>+0.05</td>
<td>+0.02</td>
<td>10</td>
<td>46.78</td>
<td>56.78</td>
<td>126</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Aftermath grazing/use

When the field was cut, there was significant growth in the treatment zones sown with Meribel, with less visible growth as you moved over the zones towards the control. Once cut, the Meribel grew quickly and was soon able to graze ewes when compared to the other zones. The Meribel zones were grazed again in the spring where there was significant early growth and then ploughed for sowing swedes in April. Total grazing days are shown in figure 7.

<table>
<thead>
<tr>
<th>No</th>
<th>Type</th>
<th>Duration (weeks)</th>
<th>Total No of Sheep Grazing</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Lambs</td>
<td>3</td>
<td>600</td>
</tr>
<tr>
<td>120</td>
<td>Ewes</td>
<td>4 (some silage fed)</td>
<td>480</td>
</tr>
<tr>
<td>45</td>
<td>Ewes + twins</td>
<td>4</td>
<td>180</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1,260</td>
</tr>
</tbody>
</table>

Figure 7 Total grazing achieved

If grazing keep had to be sought for these sheep the rental equivalent would be £567.

Conclusion

The Meribel Italian ryegrass at the three different sowing rates gave the largest reduction in overall yield of spring barley, but had the greatest grazing potential. The AberWolf, Eurostar, Donata and Comer grasses gave less of a reduction in spring barley yield but had very little grazing value in the Autumn and following spring. For the undersowing of spring barley to be financially worthwhile there needed to be at least 489 ewes grazed for 1 week or 48.9 ewes grazed for 10 weeks. The results show that the Meribel zones were giving a return of approximately 2.5 times their cost.

The additional benefits of this system are as follows:

- Clean grazing for livestock
- Reduces the need to take grazing keep at £0.45/hd/wk
- Less travelling for movements and management
- No movement requirements = reduced paperwork
- Recycling of nutrients back to the land

Figure 6 Costings
*Spring barley calculated at £150/t for grain and £80/t straw
** Seed cost plus sowing at £25.50/ha