**Background**

- Current RB209 guidelines for winter barley were developed from trials done in the 1980s. Since then the yield potential of winter barley has increased which may mean that N rates and timings need to be updated.

**N Rate review and experiments**

- A review of previous N rate experiments showed that winter barley crops with a yield of >8t/ha require more N than recommended by RB209. An additional 27 kg N/ha is required for each tonne of yield above 8t/ha.

- New N response experiments with 6 N rates (0 to 360 kg N/ha) for 6 varieties (old & new). 3 sites (Herefordshire, N. Yorkshire, Scotland). 3 years 2014, 15 & 16.

- High yielding modern varieties generally required more N to achieve their yield potential than low yielding varieties (Figure 1).

**N Timing review**

- A review of 25 previous N timing experiments showed that crops which received more than 50% of N before the start of stem extension yielded 0.5 t/ha more than crops that received less than 30% of N before stem extension.

**Conclusions**

- N rate: Modern varieties had higher optimum N rates than older varieties at 2 out of 3 sites in 2013-14.

- N timing: Early N applications increased yield compared to RB209 at 2 out of 3 sites in 2013-14.

**Acknowledgements**

Figure 1. N response curve, High Mowthorpe 2013-14

Figure 2. Early (left) and medium (right) N timings, Volume, High Mowthorpe (N. Yorks), 2013-14

Figure 3. Early N timing gave the highest yield across varieties (not significant), Rosemaund (Herefordshire) 2013-14.

**N Timing experiments**

- New experiments are investigating a wide range of N timing treatments from RB209 guidelines to very early with 30 kg N/ha applied in autumn (Table 1).

- Earlier N usually gave early ground cover (Figure 2) and greater yields for a range of variety types.

**Table 1.** Details of 4 N timing treatments, e.g. High Mowthorpe (N Yorks), 2013-14, SMN: 77kg/ha, AAN: 74kg/ha.

<table>
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<tr>
<th>Treatment</th>
<th>Autumn</th>
<th>1st split</th>
<th>2nd split</th>
<th>3rd split</th>
<th>Total</th>
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<td>0</td>
<td>150</td>
<td>190</td>
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<tr>
<td>Medium</td>
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<td>60</td>
<td>70</td>
<td>60</td>
<td>190</td>
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<tr>
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<td>120</td>
<td>70</td>
<td>0</td>
<td>190</td>
</tr>
<tr>
<td>Autumn</td>
<td>30</td>
<td>90</td>
<td>70</td>
<td>0</td>
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</table>

- N Timing review: Detailed table (Table 1) showing N timing treatments and their effects on yield.

- Conclusions: Summarising the impact of N rate and timing on yield and ground cover.