Grassweed herbicide screening trial 2010

Key Points

- A screening trial using a log-sprayer was able to give indications of the relative efficacy of different herbicides, at different rates, on a range of crops and grassweeds. Results show several promising options.
- Always consult your agronomist before implementing decisions concerning herbicide screening results.
- NB. Use of product in this trial does not constitute a recommendation.

The interpretation of the scores in table 1 is based on: 0-3 = tolerant, 3-5 = mostly tolerant, 5-8 = mostly susceptible and 8-10 = fully susceptible. However where doubt exists around the repeatability of the data based on previous results, the summary of each species may be adjusted.

Background

This research follows on from similar trials in the previous six seasons (FAR Arable Extra No. 40, 47, 60, 67, 76 and 88). The trial is designed to indicate potential herbicide options for a range of problematic grasses or crop species. NB. some species have been difficult to control with available products and therefore unregistered products have also been tested.

Three important points:
1. The grassweeds established in this trial were grown without crop competition.
2. This is one trial and should be read in conjunction with other published work on weed control.
3. Some herbicide application timings have changed compared to previous seasons.

Field trial

The trial was set up at the FAR Arable Site, Chertsey. Fourteen species were sown on 22 April 2010 in 20 m long strips. Twenty different herbicide treatments (Table 1 and 2) were tested across the species using a log sprayer which gives a concentration gradient down the length of the plots. Rates began at twice the ‘full rate’ diluting down to 20% of the full rate at the end of each 20 m plot. A score representing percentage kill at the full, half and quarter rates is reported. Plots were un-replicated. In 2010 carrots and red beet were added to the trial for the purpose of generating some vegetable seed data and also to investigate control options for these two species in other crops.

The 20 herbicide treatments sometimes included the same herbicides but used in different combinations and/or timings. The pre-emergence applications went across all species on the same day. There were three post emergence timings. The Mid July timing was included for herbicides which require cool temperatures in order to be activated. Results for these herbicides should be compared to previous years with timing changes considered when making application decisions.

Application dates:

<table>
<thead>
<tr>
<th>Application timing</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pre-emergence</td>
<td>27/4/10</td>
</tr>
<tr>
<td>2 Pre-emergence f.b. Post-emergence</td>
<td>27/4/10 f.b. 1/06/10</td>
</tr>
<tr>
<td>3 Post-emergence (Growth stage 12)</td>
<td>1/6/10</td>
</tr>
<tr>
<td>4 Mid July</td>
<td>16/7/10</td>
</tr>
<tr>
<td>5 Post- emergence (Growth stage 22)</td>
<td>20/8/10</td>
</tr>
</tbody>
</table>

For reference when comparing this season’s results to those published in previous updates; FAR 08/01 is now registered as Othello, FAR 08/02 is now registered as Firebird. DFF refers to Diffufenican e.g. Quantum.

Carrots

- Tolerant to: None of the treatments.
- Mostly tolerant to: Jaguar + Nortron, Kerb Flo, Nortron.
- Mostly susceptible to: DFF, FAR 10/02, Gardoprim, Gardoprim + Glean.

Carrots were affected by the late establishment which delayed emergence. The late establishment meant seedlings were slow to emerge and at the early season assessment it was difficult to find carrots amongst the weed populations. However, late spring assessments showed that the carrots did establish. Based on late season assessments (December 2010 which is different to the data presented above and in table 2), carrots appeared to tolerate lower rates of; Gardoprim, Nortron, and Jaguar + Nortron. Nortron is registered for use on carrot seed crops in Oregon. All other products caused some level of plant loss, it is unclear if this is due to herbicide activity alone or in conjunction with frost lift.
Red Beet

- Tolerant to: None of the treatments.
- Mostly tolerant to: Kerb Flo.

Italian Ryegrass – cv Crusader

- Tolerant to: DFF, FAR 10/02, Gardoprim, Gardoprim + Glean, Karnon.

Perennial Ryegrass – cv Grasslands Samson

- Tolerant to: FAR 10/02.
- Mostly tolerant to: DFF, Gardoprim, Jaguar + Nortron, Kerb Flo, Nortron.
- Mostly susceptible to: Gardoprim + Glean.

Susceptibility to Othello and Firebird followed by Othello gives options for Italian ryegrass control in cereal crops. However, be aware of (1) the amount of DFF applied from applying both products in one season and (2) the generally preferred practice of applying one chemical from the ALS inhibitor family per year. This may limit follow-up herbicide options.

Cocksfoot

- Tolerant to: None of the treatments.
- Mostly tolerant to: FAR 10/02, FAR 10/01 (lower rate), Jaguar + Nortron, Kerb Flo.
- Mostly susceptible to: DFF, Gardoprim, Gardoprim + Glean, Nortron, Turonex + Glean.

This year cocksfoot was mostly tolerant to FAR 10/01 (lower rate), FAR 10/02 and the post emerge treatment of Jaguar + Nortron. However, Nortron applied pre emerge was very damaging. Gardoprim susceptibility appears seasonal as last year cocksfoot tolerated the Gardoprim treatments well, but not this season.

Both Firebird and Othello appeared strong at controlling cocksfoot seedlings.

Tall Fescue – Advance

- Tolerant to: FAR 10/02, Jaguar + Nortron.
- Mostly tolerant to: DFF, Gardoprim + Glean, Nortron.
- Mostly susceptible to: Gardoprim, Kerb Flo.

For the second year in a row tall fescue showed tolerance to Gardoprim + Glean when applied pre emerge. Caution must be exercised around the use of these products on seed crops as damage is expected. Full tolerance to mid winter applications of Jaguar and Nortron could give good weed control options in first year stands.

Many of the grass weed herbicides offered control of tall fescue in cereal crops.

Italian Ryegrass showed good tolerance to Jaguar and Nortron (post emerge), Nortron (pre emerge) and DFF.

Tolerance to Nortron (and in mix with Jaguar) gives some grass weed control options, especially at higher application rates.

Susceptibility to Othello and Firebird followed by Othello gives options for Italian ryegrass control in cereal crops. However, be aware of (1) the amount of DFF applied from applying both products in one season and (2) the generally preferred practice of applying one chemical from the ALS inhibitor family per year. This may limit follow-up herbicide options.

Red beet was included in 2010 and suffered from frost lifting in plots where good broadleaf weed control was achieved.

Red Beet

- Tolerant to: None of the treatments.
- Mostly tolerant to: Kerb Flo.
- Fully susceptible to: FAR 10/02, Gardoprim, Gardoprim + Glean, Nortron.

Italian Ryegrass – cv Crusader

- Tolerant to: DFF, FAR 10/02, Gardoprim, Gardoprim + Glean, Jaguar + Nortron, Nortron.
- Mostly susceptible to: Firebird, Kerb Flo, Turonex + Glean.

Italian ryegrass showed good tolerance to Jaguar and Nortron (post emerge), Nortron (pre emerge) and DFF.

This season Gardoprim was less effective against Italian ryegrass than in past seasons, even at up to 3 l/ha (data not shown). This is the second consecutive year of disappointing ryegrass control from this product. However Gardoprim application to ryegrass seed crops should be avoided.

Most products provided some control of hairgrass this season however Gardoprim still required a follow up with Sencor to provide adequate levels of control. Othello provided useful control as did Firebird, but only at higher rates (which are above the maximum label rate).

Phalaris minor (Lesser canary grass)

- Tolerant to: FAR 10/02.
- Mostly tolerant to: DFF.
- Mostly susceptible to: Gardoprim, Gardoprim + Glean, Nortron + Kerb Flo.

Early in the season the Phalaris establishment was patchy, however many of the herbicides used, which have activity against grass weeds in general, gave some control of Phalaris if applied pre emerge or early post emerge. Othello was the only product applied that was registered for the control of Phalaris minor (note, this is the only Phalaris species on the Othello label).

Soft Brome

- Tolerant to: None of the treatments.
- Mostly tolerant to: DFF, FAR 10/02, Jaguar + Nortron, Kerb Flo.

Susceptibility to Othello and Firebird followed by Othello gives options for Italian ryegrass control in cereal crops. However, be aware of (1) the amount of DFF applied from applying both products in one season and (2) the generally preferred practice of applying one chemical from the ALS inhibitor family per year. This may limit follow-up herbicide options.
• Mostly susceptible to: Gardoprím, Gardoprím + Glean, Turonex + Glean.
• Fully susceptible to: Butisan S, FAR 10/01, Firebird, Firebird f.b. Othello, Gardoprím f.b. Sencor, Nortron (higher rates), Othello, Sencor.

Firebird and Othello (alone and in sequence) offered very good control of Soft brome as did the experimental product FAR 10/01. Gardoprím still offered useful control and when sequenced with Sencor gave high levels of control at full rates. These products have now given useful control over the past two seasons.

Nortron continues to give good control when applied pre emerge at rates of 4 l/ha.

Ripgut Brome
• Tolerant to: FAR 10/02.
• Mostly tolerant to: DFF, Jaguar + Nortron, Gardoprím, Turonex + Glean.
• Mostly susceptible to: Firebird, Gardoprím + Glean, Kerb Flo, Nortron.
• Fully susceptible to: Butisan S, FAR 10/01, Firebird f.b. Othello, Gardoprím f.b. Sencor, Othello, Sencor.

Ripgut brome continues to be a weak link for Gardoprím based treatments which for the second consecutive year required the addition of Glean or a follow up treatment of Sencor to provide useful control. Firebird provided similar levels of control but when sequenced with Othello provided good control. Othello alone showed promise for useful control as did FAR10/01. Nortron applied pre emerge continues to provide good control.

Wheat – cv Einstein
• Mostly tolerant to: Gardoprím + Glean.
• Mostly susceptible to: Butisan S, Nortron.
• Fully susceptible to: None of the treatments.

Wheat, cultivar Einstein was tolerant of all newly registered products and both experimental products. Slight damage was seen from the Gardoprím + Glean treatments at full rates, however little damage was seen in the Gardoprím fb. Sencor treatment which is often more damaging. The best control of wheat was from Nortron, although control was not complete. Kerb Flo activity against wheat was less than expected, remember Kerb Flo should never be applied to wheat crops.

Barley – cv Fairview
• Tolerant to: DFF, FAR 10/01, FAR 10/02, Firebird (low rates), Gardoprím + Glean, Jaguar + Nortron, Turonex + Glean.
• Mostly tolerant to: Butisan S, Firebird f.b. Othello Gardoprím, Kerb Flo, Othello.
• Mostly susceptible to: Firebird (high rates), Gardoprím f.b. Sencor, Nortron, Sencor.
• Fully susceptible to: None of the treatments

Barley has again shown a tendency to be easier to damage than wheat with the chemistry included in this seasons trial. The newly registered product, Firebird was safe at registered rates but damage occurred when higher rates were applied, therefore apply caution to ensure the correct rate is applied without overlaps. Othello is not registered for use on Barley and damage was seen at higher rates, however low rates were again relatively safe. Barley again showed susceptibility to Nortron, although this season control observed was lower compared to other seasons.

White Oats
• Tolerant to: DFF, FAR 10/02, Firebird, Gardoprím, Gardoprím + Glean, Jaguar + Nortron.
• Mostly tolerant to: Butisan S, Kerb Flo
• Mostly susceptible to: Gardoprím f.b. Sencor, Nortron, Turonex + Glean,
• Fully susceptible to: FAR 10/01, Firebird f.b. Othello, Othello, Sencor.

Oats again showed good levels of tolerance to Gardoprím treatments, except where followed by Sencor. Firebird alone gave little control of oats, however when sequenced with Othello control was useful.

Othello and FAR 10/01 appeared to provide very useful oat control while being safe on wheat crops, however when considering wild oat control it must be remembered that these are cultivated oats which germinated at the same time. Therefore the variable germination of wild oats under field conditions may mean a follow up oat herbicide would still be required. Neither Firebird or Othello are registered for wild oat control.

Nortron again gave useful control of oats, although not at the levels seen in the past two seasons.

Faba Beans – cv Ben
• Tolerant to: Butisan S, DFF, Firebird, Gardoprím, Gardoprím + Glean, Kerb Flo.
• Mostly tolerant to: Nortron.
• Mostly susceptible to: FAR 10/02, Gardoprím f.b. Sencor, Jaguar + Nortron, Sencor, Turonex + Glean.
• Fully susceptible to: FAR 10/01, Firebird f.b. Othello, Othello.

This was the second year of Faba beans in the herbicide screening trial. Faba beans were fully tolerant to Gardoprím and Firebird (FAR 08/02) for the second consecutive season.

In terms of controlling Faba beans in other crops, Sencor looks useful while Othello and FAR 10/01 did a good job at controlling Faba beans.

Acknowledgements:
Thank you to Bede McCloy and his team at NZ Arable, who carried out the field trial, Farhad Dastgheib, IWM Consultancy and AgResearch for supplying weed seeds and Jen Linton (FAR) for assessing herbicide effects.
Table 1. The effects herbicides which were applied at selected rates on 14 grassweed/crop species (0 = no kill, 10 = 100% kill).

<table>
<thead>
<tr>
<th>Scoring Key:</th>
<th>Carrots</th>
<th>Red Beet</th>
<th>Cockfoot</th>
<th>Tall Fescue</th>
<th>Italian Ryegrass</th>
<th>Perennial Ryegrass</th>
<th>Hairgrass</th>
<th>Phalaris</th>
<th>Soft Brome</th>
<th>Ripgut Brome</th>
<th>Wheat</th>
<th>Barley</th>
<th>Oats</th>
<th>Faba Beans</th>
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<tbody>
<tr>
<td>10 = 100% kill</td>
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</table>

* = Agrichemicals which should never be applied to cereal crops.

Table 2: The effects of 12 herbicide treatments (various products and timings), each used at three different rates (1.0x = full rate, 0.5x = half rate, 0.25x = quarter rate), across 14 grassweed/crop species (0 = no kill, 10 = 100% kill). FAR Arable Site 2010.

Please refer to text when making herbicide decisions and always consult your agronomist when making herbicide decisions.

fb. = followed by.

<table>
<thead>
<tr>
<th>GRASSWEED SPECIES</th>
<th>Pre-emergence</th>
<th>Pre fb. Post</th>
<th>Post Post-em GS12</th>
<th>Turonex 3.0 L/ha + Glean</th>
<th>Othello 1.5 L/ha + Partner at 0.5%</th>
<th>FAR 10/02</th>
<th>Jaguar + Nortron 1.5 L/ha</th>
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