Effective, sustainable Italian rye-grass control in winter cereals

Weed characteristics

Italian rye-grass (*Lolium multiflorum*) is a weed of autumn-sown crops. Sometimes it occurs as volunteers following a grass forage or seed crop but it is often found in arable fields where it has never been sown.

Rye-grass is more competitive than black-grass. Five plants/m² typically cause 5% yield loss. Rye-grass also tillers more profusely than black-grass, each plant commonly producing over 20 heads and 5,000 seeds. As a result, populations can build up very rapidly.

Herbicide resistance is present in some rye-grass populations. The extent and expression of resistance may vary according to the origin of weed infestations, and the history of herbicide use on the farm.

Rye-grass has little innate dormancy. Peak germination occurs in autumn-sown crops two to three weeks after the soil surface becomes thoroughly moist.

Recent monitoring studies have not supported a widely-held view that much rye-grass emerges in spring in winter wheat crops. The few plants emerging in spring will not thrive or set much seed in a vigorously growing autumn-sown cereal crop.

Current control options

Currently Italian rye-grass can be most effectively controlled in wheat by flufenacet + pendimethalin (Crystal) or prosulfocarb (Defy) applied pre-emergence, and iodosulfuron + mesosulfuron (Atlantis) or pinoxaden (Axial) applied post-emergence. There is a high risk with both post-emergence options that herbicide resistance may develop in weeds.

Managing weed populations

Trial plots of winter wheat were sown on three dates between mid-September and mid-October in rye-grass infested fields. There were twice as many seed heads the following June in the earliest sown, compared with latest sown, plots. However, similar plant numbers emerged after mid-November following all three drilling times.

The additional heads in earliest sown plots were due largely to the number of plants emerging before mid-November (Figure 1). No secondary emergence peak was observed in spring in any trial. Therefore, delaying sowing in autumn can result in reduced weed emergence.

Figure 1. Time of emergence of Italian rye-grass in winter wheat

Action

Delay sowing wheat to reduce Italian rye-grass infestations.

Aim to achieve effective chemical control in autumn.

Consider basing a control programme on both pre- and post-emergence herbicides.

Apply post-emergence herbicides in autumn at the earliest opportunity according to label recommendations and soil moisture status.

Rotate herbicides applied over successive seasons to minimise resistance risk.

If resistance is suspected, have a seed or plant sample tested.

Always consider your local conditions and consult a professional agronomist if necessary.
**Herbicide trial results**

In trials, autumn applied herbicide application provided the most effective control of heads the following summer.

Wheat on rye-grass infested land was drilled on three dates. All trial plots were sprayed on a single day, enabling herbicide efficacy to be tested on weeds of different sizes: largest weeds - earliest sown; medium-sized weeds - middle sowing date; smallest weeds - latest sown. The results clearly showed that weed size influenced control levels to a different extent with different herbicides (Figure 2).

**Figure 2. Impact of size of Italian rye-grass on the efficacy of post-emergence herbicides when assessed as number of heads in June 2003**

<table>
<thead>
<tr>
<th>Weed size on the day of spraying</th>
<th>% reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 leaf</td>
<td>chlorotoluron 90%</td>
</tr>
<tr>
<td>1-2 leaves</td>
<td>Ingot* 70%</td>
</tr>
<tr>
<td>2-3 leaves</td>
<td>Atlantis 80%</td>
</tr>
<tr>
<td>2-3 leaves</td>
<td>Grasp 60%</td>
</tr>
</tbody>
</table>

Experiment in Norfolk – herbicides applied end-October 2002

* To be withdrawn after July 2008

Tralkoxydim (Grasp) and Ingot (diflufenican + flurtamone + isoproturon) gave much improved season-long control when applied at the one-leaf stage of the weed. Control by chlorotoluron was less affected by weed size whilst iodosulfuron + mesosulfuron (Atlantis) gave the same season-long levels of control when applied at all three weed growth stages.

However, in one trial held on a very resistant site, all herbicides were more effective when applied at the earliest growth stage.

Typically, soil moisture around the time of application had no effect on control with pre- and post-emergence herbicides of Italian rye-grass populations that were not resistant. However, in autumn 2002, when soil was very dry, control from Atlantis was reduced. Herbicide application when the soil surface layers are moist is particularly recommended where weeds are herbicide-resistant.

**Rationale**

Compared with black-grass, there have been far fewer confirmed cases of herbicide resistance in rye-grass to date. However, reliance on current herbicide control options may not be sustainable in the longer term because of herbicide resistance.

HGCA therefore funded TAG and Rothamsted Research to investigate aspects of weed biology and other herbicide control options.

**Main findings**

Delaying sowing can significantly reduce rye-grass problems. In general, pre-emergence herbicides have a significant role to play in the control of herbicide-resistant populations. Post-emergence herbicides should be applied to small weeds.

**Further information**

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