Autumn grass weed control in cereals and oilseed rape

Maintaining grass weed control

Effective grass weed control is essential if rotations of mainly autumn-sown crops are to be maintained. Greater reliance will be placed on fewer herbicides due to increasing herbicide resistance, the absence of any new modes of action imminently available and the potential loss of key herbicides under the Water Framework Directive and other EU legislation. New weed control strategies are likely to focus on herbicides that are applied pre-, peri- (during), or early post-emergence, when the majority of the remaining available products are most effective and enhanced metabolism resistance effects are minimised. HGCA-funded research is investigating the potential to control key grass weeds using a wide array of actives and novel combinations of herbicides.

Black-grass in cereals

Winter wheat trials over the last three seasons (2008-10) have examined the effects of a range of herbicide products on black-grass populations. Herbicides were applied as single products, stacks or sequences and the results showed that:

- Stacking and sequencing of products were most effective at low to moderate black-grass populations.
- When Atlantis WG (mesosulfuron + iodosulfuron) was excluded from stack and sequence regimes, effective weed control (>95% reduction in black-grass heads) was only achieved at black-grass populations of fewer than around 100 heads/m² or 10-15 plants/m².
- The more effective herbicide regimes relied on a limited number of key active ingredients.

The most successful stacking and sequencing regimes generally needed 3 to 5 active ingredients and tended to include flufenacet. For a given series of products, there was little difference in effectiveness between stacking and sequencing in the control of black-grass (Figure 1).

Key Messages

Effective grass weed control is essential in rotations of mainly autumn-sown crops.

Potential herbicide registration losses and issues with resistance mean that weed control will need to be achieved using fewer herbicides.

Strategies to maximise grass weed control will need to make use of products that are applied pre-, peri- (during), or early post-emergence.

When Atlantis WG (mesosulfuron + iodosulfuron) was excluded from herbicide programmes for the control of black-grass in winter wheat, stacking and sequencing were likely to be most effective at low to moderate populations.

Carbetamide and propyzamide remain key active ingredients to control black-grass in oilseed rape.

For a given target weed:

Stacking is applying more than one active ingredient at the same time. This can be achieved either through mixtures or applying products that contain more than one active ingredient.

Sequencing is when different active ingredients are applied in close succession.

The use of treatments within these experiments does not constitute specific guidance. Take care not to exceed the maximum dose of a particular active ingredient in a single application or season.

Figure 1. Stack and sequence treatment effects on black-grass in winter wheat (2007/08 and 2008/09).

Treatment key:

- A = Crystal (pre-em); B = Crystal (pre-em) / Graduate (post-em); C = Crystal + Defy (pre-em) / Graduate (post-em).
- Crystal (flufenacet + pendimethalin) - BASF; Defy (prosulfocarb) - Syngenta;
- Graduate (diflufenican + flurtamone) - Bayer CropScience.
- All products were used at full label rates.

(*Only a selection of treatments from the full research programme.)
Annual meadow-grass in cereals

A range of approaches have the potential to replace the role of isoproturon (IPU). While many of these approaches require modification to timing compared to IPU, they do demonstrate dose flexibility and can also provide useful control of a range of broad-leaved weeds. Reductions in ground cover, providing >90% control of annual meadow-grass, can be delivered through pre- (eg approaches based around flufenacet, prosulfocarb or pendimethalin) and post- (eg chlorotoluron or some sulfonylurea-based products) emergence strategies.

Barren brome in cereals

Stacking and sequencing have also been researched for barren brome control. The most effective autumn programmes have tended to feature flufenacet and/or tri-allate. Autumn or spring applications of an appropriate ALS inhibiting product with a label recommendation for brome (eg products containing mesosulfuron + iodosulfuron or florasulam + pyroxasulam), can be particularly effective. At high populations the use of a suitable sequence is more reliable than the use of pre- or post-emergence treatments alone. Barren brome tends to be most effectively controlled by autumn applications, provided that the weather and soil conditions are conducive to herbicide activity. Non-chemical management practices should also be considered, particularly where brome levels are high.

Black-grass in oilseed rape

The choice of residual grass weed herbicides for use in oilseed rape is becoming increasingly limited and there is concern over some key active ingredients being found in water (eg metazachlor, carbetamide and propyzamide). Carbetamide and propyzamide are not affected by resistance in black-grass and are very important for rotational weed control. Regarding pre-emergence residual herbicides, older chemistry, such as napropamide and tri-allate, could support grass weed control programmes (Figure 2). This could provide greater flexibility for later applied residual herbicide options.

Dose and timing influence carbetamide and propyzamide performance (eg a reduced dose at a time conducive to good efficacy may be as effective as a higher dose at a less favourable time). The most effective control programmes have generally required propyzamide and/or carbetamide, demonstrating their continued importance.

Figure 2. Herbicide treatment effects on black-grass in oilseed rape.

| Treatment key: | A = Butisan S 1.5 l/ha (pre-em); B = Devrinol 2.8 l/ha (pre-em); C = Avadex Excel 15 kg/ha (pre-em); D = Kerb Flo 2.1 l/ha (applied Nov); E = Kerb Flo 1.7 l/ha (applied Nov). Butisan S (metazachlor) - BASF; Devrinol (napropamide) - United Phosphorus; Avadex Excel (tri-allate) - Gowan; Kerb Flo (propyzamide) - Dow. (*Only a selection of treatments from the full research programme. | Average of three experiments; Great Carlton 2009, 2010 and Orford 2009.

<table>
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<th>Black-grass plants/m²</th>
<th>Un treated</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<td>100</td>
<td>150</td>
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Background

New strategies to maintain autumn grass weed control in cereals and oilseed rape (HGCA project RD-2006-3341) is a collaborative research project delivered through NIAB TAG and SAC. The project aim is to develop strategies to maintain effective and economic control of specific grass weeds in autumn-sown cereal and oilseed rape crops, in the context of recent legislative developments. The project started in 2006 and finishes in 2011.

Further information

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HGCA is the cereals and oilseeds divisions of the Agriculture and Horticulture Development Board.