



## Black-grass management in New Zealand

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Black-grass (*Alopecurus myosuroides*) has become a serious grass weed in winter cereals in the United Kingdom (UK) and Europe where many populations have developed resistance to many of the grass weed herbicides used in winter cereals.

Black-grass management requires an integrated weed management approach using a range of cultural options in conjunction with herbicides. The black-grass management approach outlined in this Update are based on UK/Europe experience (AHDB 2014; Bayer 2015).

### Over the years the spread of black-grass in the UK has been encouraged by:

1. Increase in continuous winter cereals;
2. No rotations utilising other autumn or spring crops;
3. Earlier sowing of cereals, favouring black-grass germination and seedling emergence within the crop, rather than before drilling when they can be easily destroyed;
4. Non-inversion tillage or minimum cultivation, without using stale seedbeds;
5. Using home-saved seed contaminated with black-grass;
6. Over reliance on herbicides alone for weed control;
7. Increase incidence of herbicide resistance in black-grass populations;
8. Poorly drained or compacted soils that favour the growth of black-grass over cereals, especially wheat.

### Biology

Black-grass seed heads are spike-like, sometimes green, but typically purplish in colour. Individual black-grass plants produce 2 to 20 heads per plant. Black-grass has the capacity to produce 80 to 150 seeds per head. These seeds have a short dormancy period (several weeks).

In general, black-grass seedlings emerge from seeds sitting in the top 5 cm of soil. Ploughing buries the seed. Buried seeds can remain dormant in the soil for up to 11 years. Between 20-30% of buried seeds survive burial each year, so after three years burial about 1-3% of seeds will be viable. Black-grass germination is stimulated by light and the optimum soil temperature for germination is 15°C.



Black grass seedlings (L) and young plant (R)



Black grass seed heads.

## Control strategies

### Control strategies need to recognise four key factors:

1. Emergence pattern. 80% of black-grass emerges in early autumn;
2. Emergence depth. Black-grass mainly emerges from 0 to 5 cm soil depth;
3. Seed longevity in soil. The average seed decline is 74% per year;
4. Population dynamics. Greater than 95% control is needed to prevent populations from increasing; and 100% control to eradicate.

### Options to consider for managing black-grass in crops

1. Autumn sown crops other than cereals/ ryegrass for seed. Use crop alternatives that have good grass control herbicides e.g. clovers, forage and seed brassicas, beets, carrots, plantain and chicory;
2. Rotations incorporating spring-sown crops such as maize, spring sown vegetables, peas, brassicas, cocksfoot and tall fescue for seed as multiyear crops, spring cereals;
3. Delayed sowing of winter cereal to allow a bigger window for a stale-seed bed incorporating glyphosate or glufosinate (Buster®). These crops should also be sown at higher sowing rates (>300 plants/m<sup>2</sup>) to ensure more competitive pressure on black-grass. **Note:** Barley is more competitive than wheat;
4. Sow a winter green manure crop for grazing or silage; or sow as permanent pasture for 3 to 5 years (Lucerne, grass-clover-herb mixes) for grazing and/or balage-silage;
5. Plough and bury;
6. Spraying out patches of black-grass with glyphosate in early December to prevent seed return and spread;
7. Burning crop stubble.

### Herbicides for control - cereals

In the UK, herbicide recommendations for blackgrass control emphasise a sequential use of pre- and post-emergent herbicides, with consideration of chemical groups less likely to develop resistance. Pre-emergence herbicides are an essential tool that should always be used.

The following herbicides available in New Zealand are being used in the UK for black-grass control in cereals;

1. Flufenacet (e.g. Firebird® which also contains diflufenican) at 500 mls/ha pre-emergence in wheat and barley. The equivalent in UK is Liberator® which typically gives 70 to 80% control;
2. Diflufenican (Quantum® and generics) as broadleaf herbicide when applied as a tank mix or co-formulated with grass control herbicides increases control by an additional 5-10%. Incorporated in Firebird with flufenacet.
3. Tri-allate (Avadex® Xtra) as a pre-plant incorporated herbicide;
4. Pendimethalin (Stomp®, Strada) as a post sowing pre-emergence herbicide, often used as a component of a control programme;
5. Mesosulfuron (a component of Othello®), for post-emergence broadleaf and some grass weed control in wheat;
6. Pyroxsulam (Simplicity™) Selective herbicide for early post-emergence control of rip gut brome & other grass and broadleaf weeds in cereal rye, triticale and wheat (excluding durum varieties).
7. Pinoxaden (Twinax®) for the selective control of Annual Ryegrass, Lesser Canary Grass, Gnawed Canary Grass and Wild Oats in barley and wheat.
8. Fenoxaprop-P-ethyl (Puma® S, Foxtrot, etc) and clodinafop-propargyl (Mandate®) are traditional wild oat herbicides which can also control blackgrass but are at higher risk of developing resistance.
9. Trifluralin can be used on barley.

## Herbicides in other crops

1. Ethofumesate (Nortron®) at 4 l/ha gave effective control of black-grass in sugarbeets. This is rate can be used in ryegrass seed crops, tall fescue and fodderbeet; It is most effective applied pre-emergence but can be used early post-emergence before tillering.
2. Trifluralin is effective in blackgrass control as a soil-incorporated, pre-emergence herbicide and can be used over a range of legume and brassica crops.
3. Kerb in legumes and some brassicas;
4. Paraquat in some perennial legumes

Most of the selective grass control herbicides (e.g. haloxyfop (Gallant Ultra, etc), clethodim (Centurion®, Arrow®, etc), fluazifop-P (Fusilade®), fenoxaprop-P-ethyl (Puma® S, Foxtrot, etc) and clodinafop-propargyl (Mandate®) can also control blackgrass but are at higher risk of developing resistance.

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## References

AHDB 2014. Black-grass: solutions to the problem. Information Sheet 30; Summer 2014. <https://cereals.ahdb.org.uk/media/433525/is30-black-grass-solutions-to-the-problem.pdf>

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