



BLACK-GRASS RESISTANCE INITIATIVE

# Black-grass Bulletin Issue 3

A national survey of herbicide resistant black-grass



## Herbicide resistance testing

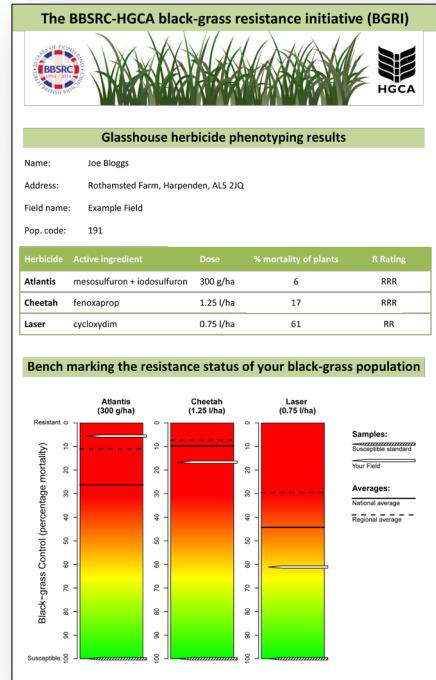
The Black-Grass Resistance Initiative (BGRI) has now completed the testing and analysis of seeds collected in summer 2014. The results provide a clear picture of the current extent of herbicide resistance across central and eastern England.

### Resistance results

Resistance testing has now been completed for the 193 black-grass populations collected by the BGRI team in summer 2014. Tests were conducted over 2014-2015 in glasshouses at Rothamsted Research, with around 50,000 individual plants screened.

The tests have focused on the ALS herbicide 'Atlantis' (mesosulfuron + iodosulfuron), along with two ACCase herbicides 'Cheetah' (fenoxaprop) and 'Laser' (cycloxydim), using a range of herbicide doses from below to well above field rates. The results allow us to paint a picture of the extent of resistance amongst our sampled populations, as well as shedding light on the differing mechanisms of resistance to these different actives.

As expected, resistance was widespread with 95%, 76%, and 52% of populations showing RRR resistance (<40% control) to Cheetah, Atlantis, and Laser respectively. Many populations were resistant to more than one herbicide, with 77% of populations displaying RR or RRR resistance (<80% control) to all three herbicides.



Resistance test results have now been sent out to everyone that participated in the BGRI seed collection over summer 2014. We hope that this information is useful to those farmers who participated in the survey, but for the BGRI team the work won't stop there.

Individual resistance feedback sheets have been sent out to all farmers that participated in the 2014 black-grass survey

## Beyond resistance testing...

A key goal for the BGRI is not to simply describe the extent of herbicide resistant black-grass, but to better understand the factors contributing to the evolution and spread of resistance. As expected, resistance was widespread, with almost all populations showing some level of herbicide resistance (right). Nevertheless, the results also show a range of herbicide susceptible populations, with values of up to 100% control observed. Clearly not all black-grass is resistant yet, and finding out why will be the subject of the next phase of BGRI research.

With this in mind, current work is now focused on relating herbicide resistance to field management histories. Between 5 – 10 years management data has been collected for each of the BGRI sampled fields. We are now working to integrate both the resistance results and these farm management histories to identify the core links between agronomy and herbicide resistance. A subset of resistant and susceptible populations from the 2014 survey are also now being grown at Rothamsted Research, to begin our further investigation of the mechanism, inheritance, and spread of resistance within and between these populations.

This will clearly be an ongoing process. Nevertheless, now that the resistance testing is over a significant milestone has been reached, so look out for further updates in later bulletins. Needless to say, none of the seed collection and subsequent resistance testing could have happened without the help and support of the farming community, and the BGRI would like to thank everyone that got involved with the 2014 and 2015 black-grass surveying.

### FAST FACTS

**193**

The number of black-grass populations tested

**~50,000**

The number of individual plants screened for herbicide resistance

**77%**

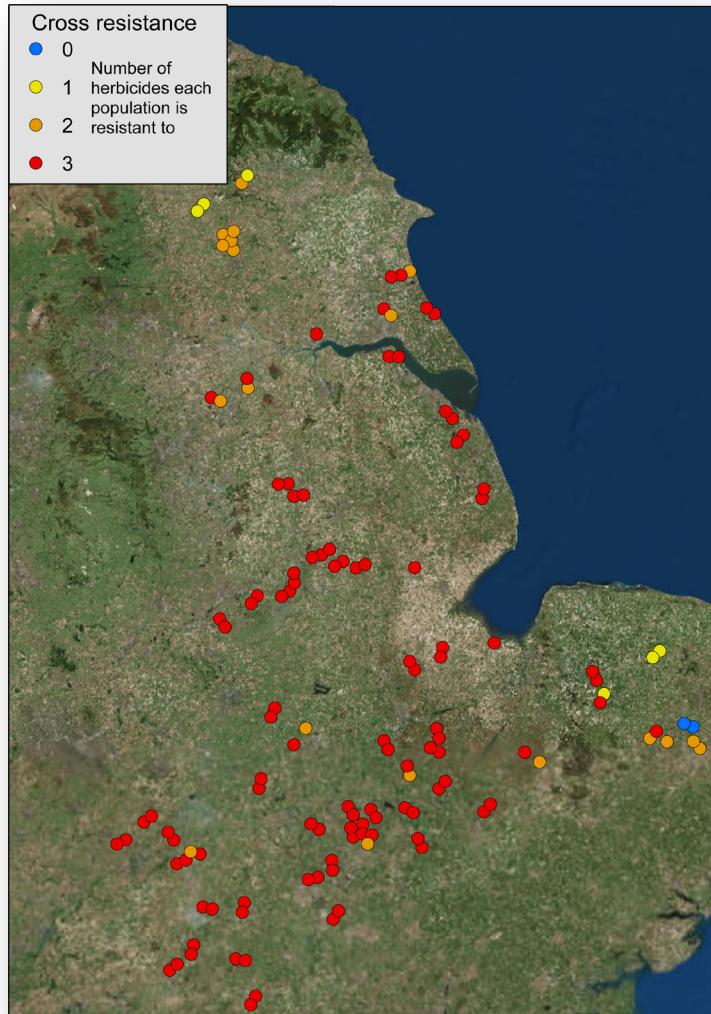
The percentage of populations cross-resistant to all three herbicides tested

## Farmer focus meeting 2015

The BGRI farmer focus meetings allow us to directly discuss research arising from the BGRI project with growers tackling black-grass in the field, whilst also hearing the farmers own experiences of black-grass control. The BGRI held its second Farmer Focus Workshop on 19<sup>th</sup> November 2015 in Cambridgeshire.

Project updates were heard on resistance test results and the two completed seasons of black-grass mapping, along with a first look at the collection of field management history data. Attending farmers gave feedback on the project and talked about their current battles with black-grass, which proved to be a lively discussion about management options including the benefits of grass leys, cover crops and rotations.

The main talking point of the meeting however was an update from Newcastle University on current tests available for confirming black-grass herbicide resistance, and the potential for developing a device that can detect non-target-site resistance in the field. Unsurprisingly this idea was enthusiastically received by those around the table, and work will be continuing over 2016 to explore the potential for this type of resistance diagnostic.



*Widespread resistance: geographic location of the BGRI populations, coloured according to their cross resistance to the three tested herbicides*

The workshop finished with a discussion led by Dr. Paul Neve around possible new approaches to manage herbicide resistance such as the Harrington seed destructor, RNAi, and other novel interventions, as well as concerns over potential future glyphosate resistance. Many thanks go to the farmers who attended the workshop, and who made it such an interesting and productive day. The continuing interest in the Farmer Focus group ensures that these meetings will continue to take place in the future.

## Upcoming event

Cereals 2016, 15<sup>th</sup> & 16th June [www.cerealsevent.co.uk](http://www.cerealsevent.co.uk) – The BGRI team will be out in force once again at Cereals 2016, ready to answer your questions about the project and highlight our progress so far. Drop by and see us on the BBSRC stand.

## FOR MORE INFORMATION

For more information on any aspect of the project please see our website at [bgri.info](http://bgri.info) or contact us by email at [bgri@rothamsted.ac.uk](mailto:bgri@rothamsted.ac.uk)