



## Resistant ryegrass in onion production

### What is herbicide resistance?

It is important to differentiate between herbicide resistance and herbicide tolerance. Over 25 weed species in Australia currently have populations that are resistant to at least one herbicide 'mode of action' (MOA) group.

Herbicide resistance is the inherited ability of an individual plant to survive a herbicide application that would kill a normal population of the same species. Herbicide tolerance, on the other hand, is the inherent ability of a species to survive and reproduce after herbicide treatment at a normal use rate. There is no selection involved (through herbicide application) because the species is naturally tolerant.

Herbicide resistance is normally present at very low frequencies in weed populations before the herbicide is first applied. Variation exists within every population, with some individuals having the ability to survive the herbicide application.

A weed population is defined as resistant when a herbicide that once controlled the population is no longer effective (sometimes an arbitrary figure of 20% survival is used). The proportion of herbicide resistant individuals will rise due to selection pressure in situations where one herbicide MOA group is applied repeatedly.

### Managing resistant ryegrass in onion production

Resistant ryegrass is an issue across many onion growing regions in Australia.

When it comes to managing resistant ryegrass, onions shouldn't be thought of as an independent crop. They are usually grown in rotation with other crops. Depending on the region, these include cereals, other vegetables, potatoes, pasture or seed crops. A range of herbicides are applied to all these crops. When it comes to growing onions, the restriction on effective registered herbicides to use is greater than for the other crops, as resistance to certain herbicides has developed in some weed species. Ryegrass is such a weed.

Director of Plant Science Consulting and researcher at the University of Adelaide, Peter Boutsalis provides the following advice to growers:

- Correct weed identification, especially at the seedling stage, is critical in terms of timing and making the correct herbicide choice. Growers should understand what resistance levels they have in their weed population prior to sowing crops to avoid wasting time and money. This can be done by having a lab such as Plant Science Consulting conduct resistance tests to establish resistance levels.
- Establishing a baseline for resistance occurrence and severity and being aware of any localised problems with herbicide resistance, such as resistant ryegrasses, should also be taken into account when considering herbicides. Knowing the history of the paddock and region, will give growers and indicator of resistance levels they may have to deal with.



Peter Boutsalis

Managing herbicide resistance requires an integrated approach. Integrated weed management (WM) tactics include:

- Reduce weed seed numbers in the soil
- Treat small weeds as they are easier to control than larger weeds
- Avoid spraying stressed weeds (moisture stress, heat, frost) as herbicide efficacy is reduced
- Rotate different mode of action herbicides to reduce selection pressure
- Integrate residual herbicides into the spray program as they offer alternative modes of action to prevent or combat herbicide resistance
- Stop weed seed set, a registered practice in some crops using glyphosate or paraquat
- Hygiene – prevent weed seed introduction
- Agronomic practices and crop competition

### Further information

Commercial herbicide resistance testing is offered by [www.plantscienceconsulting.com.au](http://www.plantscienceconsulting.com.au)

For general information on weed resistance visit the WeedSmart website <https://weedsmart.org.au>

### Tools for growers

The GRDC integrated weed management manual <https://grdc.com.au/WMM>, provides guidance suitable for onion crops, especially if grown in rotation with grain and pulse crops.

### Weed identification App

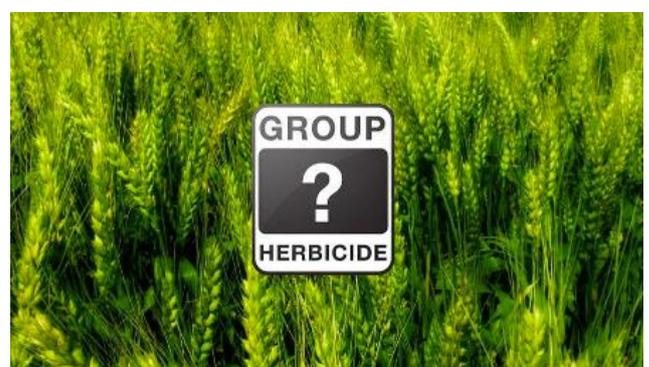
Most identification tools show images of weeds that are past the stage when you want to control them. An app that shows seedlings is the BASF Weed ID app. The GRDC WeedSmart app is also useful.

### Herbicide Resistance Tracker

Bayer Crop Science's Resistance Tracker is a national database that provides growers with information on resistance in specific post code regions. The tool can be accessed here:

<https://www.crop.bayer.com.au/tools/mix-it-up/resistance-tracker>

Bayer's Mode of Action (MOA) Search Tool assists growers identify which products are in which Group to make sure rotating modes of action are applied. Simply enter a MOA group letter (e.g B) in the search field to see herbicides with that mode of action. The tool can be accessed here: <https://bit.ly/2HFUor6>



For more information on managing Group A Herbicide Resistance in Tasmanian ryegrass populations visit: <https://www.soilwealth.com.au/imagesDB/news/GroupAHerbicideResistanceFSV6.pdf>

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