

# Testing for glyphosate resistance

(what to do if glyphosate resistance is suspected)

## Fact sheet

As part of their weed management plan, growers need to know the current status of herbicide resistance for their key weeds, particularly in their high risk paddocks.

## When to test for resistance

Growers should consider having their weeds tested for glyphosate resistance if (a) their paddocks are at risk for glyphosate resistance, and/or (b) there are survivors of a glyphosate application.

Growers can assess their risk for glyphosate resistance by completing a simple questionnaire (see 'Check your risk for glyphosate resistance' on QPI&F website). Testing is recommended if you have a 'moderate' or 'high' risk.

Testing is also recommended, if there are survivors of a glyphosate application and if the other common causes of herbicide failure are not likely, such as:

- Was glyphosate applied in conditions and at a rate that should kill the target weed?
- Did the suspect plants avoid herbicide contact or emerge after the spraying?
- Does the pattern of surviving plants suggest a spray miss or other application problem?

Glyphosate resistance appears initially in a few isolated plants. These are healthy and surrounded by dead plants of the same weed species (see photo). In the following seasons, patches of survivors can develop from these isolated plants if they are not prevented from setting seed.

If glyphosate resistance is suspected, then contact your agronomist and one of the researchers listed below for advice. Use one of the testing services listed below for determining your resistance status.



## Methods for testing for resistance

The two commercial tests for glyphosate resistance use either seeds and or whole plants.

The seed test requires seeds to be collected from the suspect population. Seedlings are grown from these seeds in pots and sprayed with a range of glyphosate rates and their responses are compared with a known susceptible and a known resistant population. The advantages of this method are that it is generally very accurate and can test a large range of herbicides and rates. However, the test generally takes 2-3 months to be done (due to seed dormancy) and the grower needs to let some suspect plants continue to grow so that seeds can be collected.

The whole plant test is known as the 'Quick-Test'. It uses whole plants (particularly useful for grass weeds) that are split into several pieces with 2-4 tillers, trimmed and placed in pots. These are tested in a similar manner to the seed test once the plants are established and growing well. The advantage of this method is the quick turn-around time for results (4-6 weeks) and there is no need to let suspect plants continue to grow to be able to collect seed.

Growers and/or consultants can also conduct their own in-situ test, which involves applying test strips of glyphosate at a robust rate and higher rates to the suspect weeds in the paddock. Indications of glyphosate resistance are the survival of suspected weed species to both glyphosate rates, but other species are controlled by both rates. Resistant weeds sprayed at the higher glyphosate rates may be set back but re-shoot within a short interval.

## Collecting samples for testing

Seed or whole plants need to be sampled from a representative area of surviving plants. It is important to record the location of these collection spots with a mud map or GPS.

For the seed test, you will need to collect several thousand **mature** dry seeds (about 1 cup of seeds for barnyard grass) from plants within the designated collection area. It is important to gather only physiologically mature seed, not green underdeveloped seed. Mature barnyard grass seed easily fall off the seed heads. Send seed to one of the testing services listed below.

For the whole plant test, you will need to collect a minimum of 50 plants, wash roots free of soil but do not wet the foliage, blot dry, wrap in moistened (but not wet) paper towel, place in a water-tight plastic bag and send by express post. See 'Quick-Test' website for more details [www.plantscienceconsulting.com](http://www.plantscienceconsulting.com)

## Where to next?

If the test is negative, but the paddock is considered high risk, then appropriate preventive actions are required. You need to reduce reliance on glyphosate and take actions to stop seed-set on survivors of glyphosate spraying.

If the test is positive for glyphosate resistance, then you will need to develop an IWM plan with your agronomist. Alternate herbicides or non-chemical options are needed to replace glyphosate to control these resistant plants.

Care needs to be taken to prevent further development of glyphosate resistance and prevent spread of resistant seed to other parts of the paddock or other parts of the farm.

## Contacts

Southern Queensland (grains): Michael Widderick [michael.widderick@deedi.qld.gov.au](mailto:michael.widderick@deedi.qld.gov.au)

Southern Queensland (cotton): Jeff Werth [jeff.werth@deedi.qld.gov.au](mailto:jeff.werth@deedi.qld.gov.au)

Central Queensland (grains & cotton): Vikki Osten [vikki.osten@deedi.qld.gov.au](mailto:vikki.osten@deedi.qld.gov.au)

## Seed testing service

John Broster, Charles Sturt University, Wagga Wagga; (02) 6933 4001 [jbroster@csu.edu.au](mailto:jbroster@csu.edu.au)

## Seed and Quick-Test service

Peter Boutsalis, Plant Science Consulting, Adelaide; 0400 664460 [info@plantscienceconsulting.com](mailto:info@plantscienceconsulting.com)

**Written by:** Steve Walker (Queensland Primary Industries & Fisheries, Toowoomba)

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