

HERBICIDE RESISTANCE

Introduction

Pesticides have been used widely in agriculture for many decades to manage weeds, insects and diseases. Over this time there has been an ever-increasing range of products available to deal with pests. Products range from those with very specific target sites and minimal environmental impact, to products that are broad-spectrum, and may remain active in the environment for weeks or months.

While there has been an ever increasing range and number of products available to manage weeds, there is also now an increasing number of weeds that are resistant to some of these products. These weeds were initially controlled by the herbicides, but as a result of repeated exposure, resistant individuals have been selected from the population and have come to dominate the population.

Herbicide resistant and particularly glyphosate resistant weeds are now a major issue for the Australian cotton industry. These resistant weeds will rapidly come to dominate fields unless there is a change in the weed management strategies.

Cotton growers need to return to using an integrated approach to weed management, ensuring that herbicides, and especially herbicides with the same mode of action, are never used as the only method of weed control. Steps to developing a sustainable system are covered in the following articles.

C2. Managing Herbicide Resistance in Cotton

When applied correctly, a herbicide effectively controls its target weed. Repeated use of a herbicide has two effects. Firstly, the herbicide selects for the more tolerant weed species, resulting in a species shift in favour of those tolerant species. Secondly, the herbicide selects out the more herbicide resistant individuals from within a species and the frequency of these individuals increases within the population, leading to the development of herbicide resistance.

The development of species shift and herbicide resistance can be managed using an integrated weed management strategy that combines the use of all the weed management tools, including herbicides from different herbicide groups, cultivation, chipping and good crop agronomy.

Basic information is given on herbicide resistance, herbicide groups, herbicide modes of action, weed monitoring and the necessary response to a suspected case of herbicide resistance.

C3. Herbicide Resistance and the Crop Management Plan

The conservation farming system is failing due to overreliance on glyphosate in the system, resulting in the wide spread emergence of glyphosate resistant weeds in summer fallows. The potential for this resistance to spiral into disaster is very real, as shown by the increasing resistance problems with herbicide resistance in the US.

This paper discusses these issues and explains the value of the approach used in the Crop Management Plans of Roundup Ready, Roundup Ready Flex and Liberty Link cotton for managing the development of resistance.

