

Resistance warning with GM crops

The Cooperative Research Centre for Australian Weed Management (Weeds CRC) recently cautioned that Australia must observe Canada's approach to integrated weed management if it is to introduce herbicide-tolerant crops and manage them in a way that does not increase the risk of herbicide-resistant weeds.

The warning comes as Victoria and New South Wales lifted their moratoria on GM canola late last year and other states review their rules on GM crops.

Leading herbicide expert Dr Chris Preston, of the Weeds CRC and the University of Adelaide, believes the introduction of GM herbicide-tolerant crops can provide real benefits to agriculture, but there are clear lessons from the Canadian and US experience that Australia must not ignore.

Speaking at an awards dinner for the CRC's research achievements, Chris highlighted that glyphosate-resistant weed problems are on the increase in the US due to the reliance on Roundup Ready cropping systems.

"Since the introduction of GM herbicide-tolerant crops in the mid 1990s, glyphosate resistance has occurred in eight weed species," he said.

Canadian farmers, on the other hand, are smiling. GM herbicide-tolerant crops were introduced in 1996, yet glyphosate resistance is yet to emerge. The difference is 'integrated weed management'.

IWM keeps resistance at bay in canola

"Herbicide resistance in Canada has been kept at bay through effective rotations of both crops and herbicides used in their farming systems," said Chris.

"In Canada, there are three GM herbicide-tolerant canola types and only one is glyphosate-tolerant.

"Contrast this with the US where 91 per cent of the soybeans, 70 per cent of the cotton and 52 per cent of the corn are Roundup Ready.

"The chance of resistance developing is far lower in Canada where both crops and herbicides are rotated and glyphosate is used less intensively." In fact, adds Chris, Canadian farmers have used glyphosate-tolerant canola strategically to manage other herbicide-resistant weeds and to reduce the weed seedbank in the soil. They employ other methods to maintain effective weed control in subsequent years.

This dramatically reduces the pressure on weeds developing resistance, and illustrates how GM herbicide-tolerant crops might be deployed in Australian farming systems to break weed cycles.

"Australia is in an enviable position to use the experience of other countries to inform how GM herbicide-tolerant crops should be managed," Chris said.

The discovery earlier this year of Australia's second glyphosate resistant weed – awnless barnyard grass (*Echinochloa colona*) – highlights the importance of managing glyphosate use.

"Awareness is the key," said Chris. "We can follow the Canadian experience or go down the path that the US has, but we cannot say we have not been warned.

"In Australia, we have successfully introduced Roundup

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GM canola in Australia will need to be grown under particular protocols to limit the development of herbicide-resistant weeds. (Photo: Carl Davies, CSIRO Plant Industry)

Ready cotton, and last year Liberty Link cotton, with farmers following integrated weed management plans. We need the same attention to integrated weed management with herbicide-tolerant canola."

Contact: Dr Chris Preston, Weeds CRC/University of Adelaide, 0438 892 362.

More information: Integrated Weed Management manual: www.weeds.crc.org.au

GM CANOLA AND WEEDS

Growers seeking to produce glyphosate-resistant canola have been urged to learn from experiences in the US and carefully manage weeds to help preserve the benefits of this GM technology.

Visiting US weed scientist Dr Phil Stahlman, currently based at the Tamworth Agricultural Institute with the NSW Department of Primary Industries, said that while US farmers had made considerable productivity and efficiency gains with the use of GM crops, many had been slow to implement practices to preserve the utility of glyphosate and glyphosate-resistant crops (GRCs).

"From 1992 to 2002, glyphosate use in the US increased six-fold due largely to the adoption of GRCs," he said. "Significant increases in both the use frequency and the number of hectares receiving glyphosate have greatly increased the potential for selecting glyphosate-resistant weeds."

Phil presented his findings from long-term studies initiated in 1998 to determine the effects of glyphosate use patterns on weed populations in GRCs at the GRDC Adviser Updates in Adelaide in February.

One of the study's key findings with GM maize was that repeated applications of low or marginal rates of glyphosate over successive years could have adverse effects on weed population control compared to the application of full-label rates.

"There is also evidence at the Scottsbluff research site in Nebraska to indicate higher glyphosate rates are now needed to control the common lambsquarter weed as effectively than several years ago. This is consistent with grower observations on other species as well."

Phil said Australian growers planning to introduce GM canola into their cropping system needed to thoroughly understand their weed populations.

"Australian growers should consider implementing 'stewardship' practices to preserve the value of this GM technology," he said. "There are several things they can do, such as alternating glyphosate with other herbicides with different modes of action, and ensuring they select glyphosate rates which are appropriate to specific target weeds."

"Resistance starts with just a few plants escaping due to low rates of herbicide application. Australian growers planning to sow GM canola can't afford to ignore this. They can still maintain very effective weed control – profitably – with higher rates of glyphosate, the use of other herbicides with alternate modes of action, and crop rotation. It is important that the crops grown in rotation are competitive with weeds."

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