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Nuffield scholar sees weeds risk in GM enthusiasm

As eastern Australia winds up its first harvest of genetically modified canola, NSW grain grower and Nuffield Scholar Murray Scholz says reaping the benefits of the new technology will depend on learning the lessons from the GM experience of the US and Canada.

By Catherine Norwood

To protect the potential benefits genetically modified crops offer to Australian grain growers Nuffield scholar Murray Scholz believes regulation may be needed to prevent poor management practices that could heighten the risk of weed herbicide resistance.

Mr Scholz, who has this year grown herbicide-tolerant genetically modified (HTGM) canola, has spent three of the past 12 months investigating North America's experience with GM crops as part of his Nuffield Scholarship, sponsored by the Grain Growers Association.

He says the North American experience shows it is essential that sound agronomic practices are followed, which includes a break of at least two years between GM crops. "I believe it (resistance) is largely a result of lazy management practices, but I can also see growers (who are) trying to recover from poor returns over the past few years ... pushing crop rotations."

Australian growers have already experienced increased levels of pest, weed and herbicide resistance as a result of unceasing wheat-canola, wheat-canola rotations, particularly in the west. Mr Scholz believes the risk of widespread glyphosate resistance as a result of growing Roundup Ready (RR) canola in such a rotation is so significant regulation may be required to prevent the practice. Glyphosate is the active ingredient in Roundup and is Australia's most widely used herbicide.

Glyphosate resistance has already emerged in most grain growing regions in Australia, and in the US it has become a critical problem for no-till systems that rely on chemicals rather than cultivation to control weeds.

Mr Scholz says this is why the industry needs to act now to stop poor weed management from negating the agronomic and productivity benefits that everyone is looking for from herbicide tolerant GM crops.

"We need to be aware of this, because once it becomes an established problem, it's too late. At the moment, there is nothing to stop me growing RR canola every year, or every other year, but our experience in Australia, and the experience in the US, shows us what problems that kind of continual rotation can ultimately produce. We need intervals of at least two years between crops, and the greater variety of crops, the better."

Australia already has the dubious honor of recording the first glyphosate-resistant weed – annual ryegrass in conventional wheat farming systems – even before the introduction of Roundup Ready cotton in 2001 and Roundup Ready canola in 2008.

Mr Scholz says the current Australian code-of-practice and stewardship programs for GM growers are an important part of best practice management and should remain in place indefinitely. He has also discussed the possibility with Monsanto that the company mandate adequate breaks between GM crops as part of the agreement between seed company and farmer to grow Roundup Ready canola.

Mr Scholz says he uses stewardship principles and integrated weed management strategies on his own property at Culcairn in southern NSW, including hay and silage production that helps to reduce weed seed set. He grows canola as part of a five-year rotation, and this year planted 250 hectares of triazine tolerant (TT) varieties and 120 hectares of the new Roundup Ready canola.

He is impressed with the weed control in the Roundup Ready canola, which was direct drilled into stubble sprayed with trifluralin as a pre-emergent knock-down. The crop showed strong early seedling vigour, which smothered the weeds, and required only one pass with Roundup. Despite being sown 10 days later than his TT canola, he says it is a cleaner, better looking crop, maturing at the same time as the earlier crops.

Mr Scholz has no doubt that the new HTGM canola will prove popular with growers and Australia's experience could well mirror that of Canada, in those states where GM crops are allowed. Within five years of GM canola being introduced in Canada it made up 80 per cent of the national crop.

"But Australian farmers will need to overcome the urge to sit back and relax about weed management because they have HTGM technology. If they use it as part of a wider integrated strategy there is potential to drive down weed numbers to very low levels. The smaller the number of weeds, the lower the chance of resistance developing to glyphosate and to other herbicides as well," he says.

Mr Scholz says his visit to the US and Canada highlighted the importance of crop diversity and strict integrated weed management (IWM) strategies in preventing resistance to glyphosate. GM crops have been successfully grown in North America since 1996, with soybeans, canola, corn, cotton, alfalfa and sugar beet varieties released.

Mr Scholz says Canadians use GM crops as part of a holistic IWM program. They use different pre-emergent and post-emergent herbicides. Canola, for example, can be tolerant to glyphosate, glufosinate or imidazolinone, and all three products are used at different times. Most farmers use high seeding rates and choose hybrid crop varieties with early vigour, which suppresses weeds. They grow GM crops as part of a four-year rotation, with at least three different crop types.

In the US some growers often continuously crop just one or two crops, most commonly soybeans, corn and cotton, and rely almost exclusively on glyphosate as a single weed control strategy. Mr Scholz says growers also commonly reduce their seeding rates and herbicide rates to reduce costs, in what he describes as a "love-hate" relationship with chemical companies: "They love the technology, but hate being forced to pay the higher costs involved."

He says the critical issue for all grain growers is that there are no new chemicals on the horizon to replace glyphosate: "If it becomes ineffective, it would be a nightmare. It costs around \$200 million and 10 years to develop a new herbicide, but there is less and less research and fewer new products being developed because the costs keep going up and environmental accountability keeps getting tougher."

Mr Scholz says although some people may be complacent about protecting the effectiveness of existing herbicides there are no new 'modes of action' on the horizon. The last breakthrough was in 1991 when protoporphyrinogen-oxidase (PPO) inhibitors (Group G) were discovered.

Mr Scholz's Nuffield Scholarship report *Integrated Weed Management and the implications of herbicide tolerant crops* is available from the Nuffield International website <http://www.nuffieldinternational.org/> or from the Grain Growers Association website www.graingrowers.com.au

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A high-resolution photograph of Mr Scholz can be downloaded from the link www.coretext.com.au/communications_images.php

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