

4 September 2012

Subject: Contribution to glyphosate resistance research project

Background

The RCA Forum has been asked to support a Foundation for Arable Research project aimed at avoiding the occurrence of glyphosate resistance in weed species in New Zealand. This paper recommends a contribution to this project from the Workgroup research and development budget.

Glyphosate is now New Zealand agriculture's most frequently used herbicide. Much of our agriculture and infrastructure maintenance has become glyphosate-dependent. The development of glyphosate resistant weeds has occurred in Australia and is rapidly occurring in other countries. Resistance has been hastened by repeated use around roadside markers and structures, crop boundaries, vineyards and orchards.

If New Zealand loses glyphosate for effective weed control through development of resistance, the consequences will include:

- I. Greater dependence on less environmentally friendly herbicide options used in place of glyphosate will increase the risk to operators of exposure to scheduled herbicides classed as toxic as well as the risk to the environment.
- II. Greater dependence on more intensive cultivation will lead to greater degradation of soil structure and soil health.
- III. Greater operating and maintenance costs for controlling weeds formerly controlled by glyphosate using chemicals or methods requiring greater measures for operator or environmental protection.
- IV. Reduced income from all forms of agriculture due to reduced crop yields as a result of increased and resistant weed competition.
- V. Increased costs for "total" weed control strategies.

Weed resistance to glyphosate would also increase the "resistance pressure" on other herbicide modes of action. In other parts of the world there are already plants with multiple resistance mechanisms.

New Zealand needs a strategy to prevent the same problems occurring here. Over 500,000 hectares are now under reduced cultivation and direct drilling practices heavily dependent on the repeated use of glyphosate. Similarly, conventional cropping and pasture renovation systems frequently depend on glyphosate to control vegetation before cultivation and after crop removal. Vineyard and orchard tree lines and other perennial

crops are commonly repeatedly treated solely with glyphosate to manage weeds. It is now common for both national and local authorities to manage roadside vegetation only with repeat applications of glyphosate.

The use of repeat applications of glyphosate alone is unsustainable from experience overseas, particularly in Australia, where resistance has developed following less than 20 consecutive applications.

There is the risk, too, of importing glyphosate resistant weeds with imported grains, seeds or farm machinery, and accidentally contaminating rural New Zealand. The most recent published information reveals there are 21 different weed species worldwide known to be resistant to glyphosate. Many of these species are present in New Zealand. Most important among these are both annual and perennial ryegrass, for which there are 28 instances of glyphosate resistance in nine different countries.

The spread of glyphosate resistant weeds, either in or around crops or on the roadside, would have a huge impact on the cost of weed control. Glyphosate resistance is now costing Australian horticultural and arable growers an extra \$AUD 50 -100 per hectare. Based on 500,000 ha in just the arable sector in New Zealand, the cost would be \$25-50 million per annum.

Current practices and usage of glyphosate in New Zealand will lead to the evolution of glyphosate resistance. There is an important opportunity to prevent this occurring by:

- Increasing awareness of the risk and the ramifications of resistance; and
- Developing management strategies to reduce reliance solely on glyphosate. These will include other herbicides (potentially new chemistry) in rotation with glyphosate, cultural management techniques, and techniques for early detection and response to glyphosate resistance.

The FAR-led research hopes to lead to sector-specific industry guidelines for glyphosate that will increase the use of sustainable weed management practices and reduce the risk of resistance developing.

The impact of glyphosate resistant weeds will be felt in all agricultural industries throughout the country, therefore the community of interest represents all agricultural sectors and all regional/national authorities responsible for vegetation control.

The three year research project will involve multiple field trials and testing programmes across all major sectors of the agricultural sector. The total project budget will be about \$550,000.

Trial work on vegetation control will be conducted in conjunction with NZTA in the Canterbury and Waikato regions. The research will define the weed spectrum that develops around roadside markers in relation to the unsprayed areas and evaluate the rate of spread from areas subject to roadside marker vegetation control and weeds at the arable field boundary. This work will be undertaken at ten distinct sites in each region. In conjunction with this will be a replicated trial on roadside vegetation control evaluating

five or six newer post-emergence herbicides with shorter residual activity both in conjunction with, and in the absence of, strategically timed mowing treatments. Assessments will include weed presence and species, seed production and seed dispersal.

FAR has secured Ministry of Primary Industries funding through the Sustainable Farming Fund and funding from other stakeholders, as shown in the table below.

Income	FY1	FY2	FY3	Total
	2012/2013	2013/2014	2014/2015	FY 1+2+3
SFF Funds requested (this fund)	85000	85000	85000	255,000
Other Central Government Funds (state name)				
Community Contribution (state names) :Dairy NZ	5000	5000	5000	15,000
Other Source 1 FAR	55400	50600	55400	161,400
Other Source 2 HortNZ	5000	5000	5000	15,000
Other Source 3 Local Government NZ	5000	5000	5000	15,000
Other Source 4 Agchem Companies	4000	4000	2000	10000
Other Source 5 NZTA	1000	1000	1000	3000
Total A: Total Cash Contributions	160400	155,600	158,400	476,400
B. In-kind Contributions				
Community Contribution (state names):HortNZ	4000	1000	1000	6000
Contributor 1 FAR	5000	5000	5000	15000
Contributor 2 Dairy NZ	5000	5000	5000	15000
Contributor 3 Ag Chem Companies	1000	1000	1000	3000
Contributor 4 NZTA	1000	1000	2000	4000
Contributor 5 Regional Councils	4000	4000	4000	12000
Total B: Total In-kind Contributions	20000	17000	18000	55,000
Total C: Total Contributions	180,400	172,600	176,400	531,400

Discussion

FAR has sought RCA Forum support for this project and approached the Research and Guidelines Steering Group for a funding contribution. At its meeting on 9 August 2012 the Research and Guidelines Steering Group heard a report on this project and noted the potentially significant impact of glyphosate resistance on RCA Forum members, and on rural members particularly. The return on investment of contributing to research to successfully forestall this occurring was agreed to be too great to ignore and the Group unanimously agreed that a contribution would be made from the workgroup research and development budget.

The workgroup research and development budget for 2012-2013 is \$40,000. None of this budget has been allocated to date.

Proposal

It is proposed that \$5000 be allocated to the glyphosate resistance research project in the current year and provision be made to allocate two further contributions of \$5,000 in 2013-2014 and in 2014-2015 from the workgroup research and development budget.