



Project Number: PRJ-006914

Project Name: Management of glyphosate resistant weeds in non-agricultural areas

GLYPHOSATE RESISTANCE IN NON-CROPPING AREAS OF AUSTRALIA

The issue

Glyphosate is the most widely used herbicide for weed control in Australia, in both agricultural and non-agricultural situations. While glyphosate resistance has occurred at numerous sites in agricultural systems in Australia, it has also begun to appear in a number of non-agricultural settings including road sides, railway rights-of-way and irrigation channels. Glyphosate resistance in these non-crop areas, in addition to causing immediate impacts, has the ability to spread into other areas and cause management difficulties elsewhere. Herbicide resistance in non-agricultural situations has not been reported often and little is known about the risks of herbicide resistance evolving in these areas.



Glyphosate resistant weeds occur in patches on road sides where glyphosate is the only weed management strategy used. Left: glyphosate resistant annual ryegrass in a ditch along a road. Right: glyphosate resistant windmill grass on the edge of a roadside.

Latest Research

A physical survey of areas likely to be at high risk of glyphosate resistance was conducted across Australia to obtain a better understanding of the extent of glyphosate resistance in non-cropping areas. Surveys were conducted in Western Australia, South Australia, Victoria, New South Wales and Queensland and involved driving along major roads and highways and collecting weed species present on the roadsides, along railway right-of-ways and around buildings or irrigation channels. Four different weed species were targeted in the survey: annual ryegrass (*Lolium rigidum*), fleabane (*Conyza bonariensis*), windmill grass (*Chloris truncata*), and barnyard grass (*Echinochloa colona*).

More than 400 samples of whole plants or seed of the four species were collected from SA, NSW, QLD, VIC and WA. Resistance was identified in all four weed species. High frequencies of glyphosate resistance were identified in annual ryegrass and fleabane, where more than 50% of populations contained high numbers of resistant individuals. Resistance was identified in all states surveyed.

Glyphosate resistance was found to occur in all non-agricultural areas surveyed. Roadsides, often adjacent to crops, were where a majority of the resistant samples were from. However, resistance was also identified along irrigation channels, railway rights-of-way and around buildings, such as silos.

Summary of the location and number of populations collected, and number of glyphosate resistant populations for each species collected from the non-cropping area survey.

Species	Location	No. collected/ No. resistant	Total	Resistant (%)
<i>L. rigidum</i>	NSW	75/37	186	50%
	SA	54/41		
	WA	57/15		
<i>C. bonariensis</i>	QLD	9/7	84	52%
	NSW	41/31		
	VIC	14/0		
	SA	12/6		
	WA	8/0		
<i>E. colona</i>	QLD	1/1	9	33%
	NSW	8/2		
<i>C. truncata</i>	Vic	65/6	150	7%
	WA	22/1		
	SA	6/0		
	NSW	55/1		
	QLD	2/0		



Fleabane populations sprayed with glyphosate showing susceptible and resistant individuals

Implications

This study has demonstrated there is a large amount of glyphosate resistant weeds in non-cropping areas. These resistant weeds need to be controlled by other weed management techniques. Glyphosate resistant weeds evolve wherever there is intensive reliance on glyphosate for weed control and few or no other weed management practices used. Glyphosate resistant weeds in non-agricultural areas have the potential to spread into nearby agricultural production areas and vice versa. Effective management of glyphosate resistant weeds in non-agricultural areas will reduce this risk.