

# 16. New Pre Emergent Grass Weed Control Herbicides in Triazine Tolerant Canola

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## KEY MESSAGES

- Ryegrass is an increasingly significant weed in the SE of SA and Western Victoria due resistance to major knockdown, pre emergent and post emergent herbicide chemistries.
- As resistance develops to post emergent chemistry, pre emergent chemistry becomes increasingly important in managing resistant ryegrass.
- Knowing the resistance status of weeds within a paddock allows for the most cost effective herbicide to be applied....the most expensive herbicide is the one that doesn't work.
- Incorporating alternative herbicide modes of action can improve ryegrass control especially where the presence of Group D resistant ryegrass is suspected or known.

## Background

Ryegrass is an increasingly significant weed in the SE of SA and western Victoria due to the development of resistance to major knockdown, pre emergent and post emergent herbicide chemistries. Table 1 shows that in 2012, 78% of random paddock samples in SE SA were resistant to the Group D pre-emergent herbicide Trifluralin. This sampling also showed that the Group A

and Group B post emergent options including Diclofop-methyl (Hoegrass), Pinoxaden/Cloquitocet-methyl (Axial), Clethodim (Select) and Imazamox/Imazapyr (Intervix) also had significant levels of resistance to annual ryegrass; 90%, 80%, 43% and 60% respectively. By comparison, in the other regions sampled ryegrass resistance to the Glyphosate is also an emerging issue.

**Table 1.** Latest Herbicide Resistance Status in SA and Victoria.

Herbicide	REGION AND YEAR						
	Mid-North / YP 2013	SA Mallee 2012	SA South-East 2012	Eyre Peninsula 2014	Vic Western 2015	Vic Northern 2011	Vic Southern 2014
Trifluralin	66	43	78	34	30	0	2
Boxer Gold	0	-	-	1	0	.	0
Sakura	0	-	-	0	0	-	0
Hoegrass	74	20	90	44	56	55	86
Oust	71	61	74	76	61	87	96
Intervix	88	36	60	44	33	31	33
Axial	65	12	80	17	28	29	54
Select	13	3	43	4	5	8	6
Glyphosate	1	0	16	1	6	0	2

Source: Chris Preston, The University of Adelaide

Canola is a significant break crop in Australian broadacre cropping systems, used in part to help manage ryegrass populations. In the next 3 years several new pre-emergent herbicides will be registered and introduced into this market.

Most of these herbicides will be registered to control ryegrass and some other significant weeds. They will also introduce some new modes of action previously not used for ryegrass control in canola.

## Activities

Trial Design includes 3 by replicates of random block design.

Plots Size - 2m x 10m using plot seeder with 6-inch row spacing.

Sowing Date 5/5/2017 by SARDI New Agronomy Group.

Farmer standard practice Knockdown herbicide was applied 2 weeks prior to sowing followed by second application 2 days prior to sowing. No residual products were used and control for all broadleaf would be deemed commercially acceptable. However there were some ryegrass survivors.

Ryegrass samples were sent to Plant Science Consulting for resistance testing.

Treatments (Table 2) were applied using trial boom at 74.7 l/ha using rainwater and Turbo T-jet nozzles in medium droplet spectrum.

There was adequate soil moisture at time of sowing.

- Fertiliser: Local standard.
- T1 = Pre-emergent incorporated by sowing - 5/5/2017
- T2 = Early Post emergent - 7/7/2017

**Table 2.** Trial treatments.

TRT NO.	TREATMENT 1	TIMING	PRODUCT RATE (ml - g / ha)	TREATMENT 2#	TIMING	PRODUCT RATE (ml - g / ha)
1	Untreated	---	---	---	---	---
2	Atrazine	T1	1100g	Untreated	---	---
3	Untreated	---	---	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100g + 500ml + 40g + 1%
4	Atrazine + Trifluralin 480	T1	1100g + 1800ml	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100g + 500ml + 40g + 1%
5	Trifluralin 480 + Avadex Xtra + Atrazine	T1	1800ml + 3200ml + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
6	Altiplano + Avadex Xtra + Atrazine	T1	2000g + 1600ml + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
7	Altiplano + Trifluralin 480 + Atrazine	T1	2000g + 1000ml + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
8	Altiplano + Atrazine	T1	3000g + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
9	Altiplano + Arcade + Atrazine	T1	2000g + 2500ml + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
10	D500 + Atrazine	T1	2000g + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
11	Rustler + Atrazine	T1	1000kg + 1100gm	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
12	Butisan + Atrazine	T1	1800ml + 1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
13	Simazine	T1	1100g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%
14	Simazine + Atrazine	T1	550g + 550g	Atrazine + Clethodim + Lontrel + Kwickin	T2	1100gm + 500ml + 40gm + 1%

g = gram; ml = millilitres

### Herbicide Resistance Test

Ryegrass plants from the buffers were sampled and sent to Plant Science Consulting for resistance testing. The results showed high level of resistance to the Group A Fop herbicide Verdict but no resistance to Group A Dim herbicides, Clethodim and Butoxydim. However 20% of the plants sampled showed resistance to Glyphosate when applied up to 2l/ha. Trifluralin and pendimethalin was also and showed 45% and 20% resistance respectively. This is consistent with field.

**Table 3.** Results as determined by resistance testing 3 weeks after treatment. Data recorded as % survival (% of plants surviving) as compared to untreated plants. 100% refers to all plants surviving and 0% refers to death. Data is the mean of 2 replicate plots per herbicide rate. Included in the test was a susceptible (S) biotype and resistant biotypes. Data for S and R biotypes is not shown.

Herbicide (rate / ha)	Herbicide Group	Paddock Sample MFMG Trial Site	
		Survival	Rating
Factor 180g/ha + 1% Supercharge	Group A - Dims	0	S
Select 500ml/ha + 1% Hasten	Group A - Dims	0	S
Select 500ml/ha + Factor 180g/ha + 1% Supercharge	Group A - Dims	0	S
Select 750ml/ha + 1% Hasten	Group A - Dims	0	S
Verdict 100ml/ha + 1% Hasten	Group A - Fops	100	RRR
Trifluralin 2 L/ha	Group D - Dinitroanilines	45	RR
Glyphosate 540 @ 1.0 L/ha	Group M	20	R
Glyphosate 540 @ 2.0 L/ha	Group M	20	R
Glyphosate 540 @ 3.0 L/ha	Group M	0	S
Pendimethalin 1.0 L/ha	Group D - Dinitroanilines	20	RR

Resistance Rating:

RRR - indicates plants tested have strong resistance

RR - indicates medium-level resistance

R - indicates low-level but detectable resistance

S - indicates no detection of resistance

### Weed Plant Population and Control

Weed plant counts (plants/m<sup>2</sup>) were assessed 21 days after sowing (26/5/2017) and 42 days after sowing (16/6/2017), prior to the T2 post emergent application.

At 21 days after sowing (data not presented) there were no significant differences in weed plant counts between treatments. This was due to the dry conditions post sowing; the site didn't receive significant rainfall until the 18/5/2017. Although there were no significant differences between weed populations between treatments at this timing, ryegrass, wild radish, lesser looestribe, volunteer faba beans and sub-clover plants were observed throughout the plots.

At 42 days after sowing only D500 at 2kg/ha and Propyzimide 1.5kg/ha both with atrazine 1.1kg/ha showed significantly better control of ryegrass over the untreated control plots (Figure 1). Due to the extreme variability within the plots as indicated by the CV of 76.78 these results should be interpreted with caution.

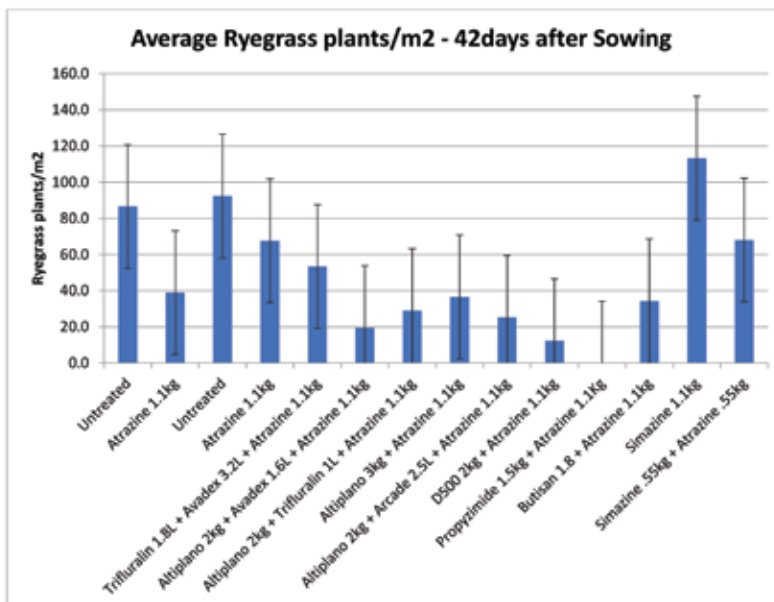


Figure 1. Ryegrass plant populations (Plant/m2) 42 days after sowing.

## Weed Plant Population and Control

### Ryegrass

Percentage weed control was assessed at 34 and 126 days after the post emergent application (T2).

At 34 days post T2 all treatments with the T2 application had significantly better ryegrass control than the untreated control treatment (Figure 2). This can be attributed to the resistance status of the paddock and that from the resistance test there was no resistance to clethodim found.

However only the treatments containing Altiplano 2kg/ha + Avadex 1.6l/ha, Altiplano 2kg/ha + Trifluralin 1l/ha, Altiplano 3kg/ha, Altiplano 2kg/ha + Arcade 2.5l/ha, D500 2kg/ha, propyzimide 1.5kg/ha and Butisan 1.8l/ha all with atrazine at 1.1kg/ha as

pre-emergent application provided commercially acceptable control of ryegrass. These treatments, with the exception of butisan 2kg/ha and Altiplano 2kg + Arcade 2.5L/ha also provide commercially acceptable control when assessed at 126 after T2 application.

These treatments were also significantly better than applying a single post emergent application of Select 500ml/ha + atrazine 1.1kg/ha + Iontrel 40gm/ha.

There were no significant differences between the effectiveness of the new herbicides tested in this trial.

Ryegrass control 126 days post T2 was more variable (Figure 3) treatment with no significant difference between new pre emergent's trialled.

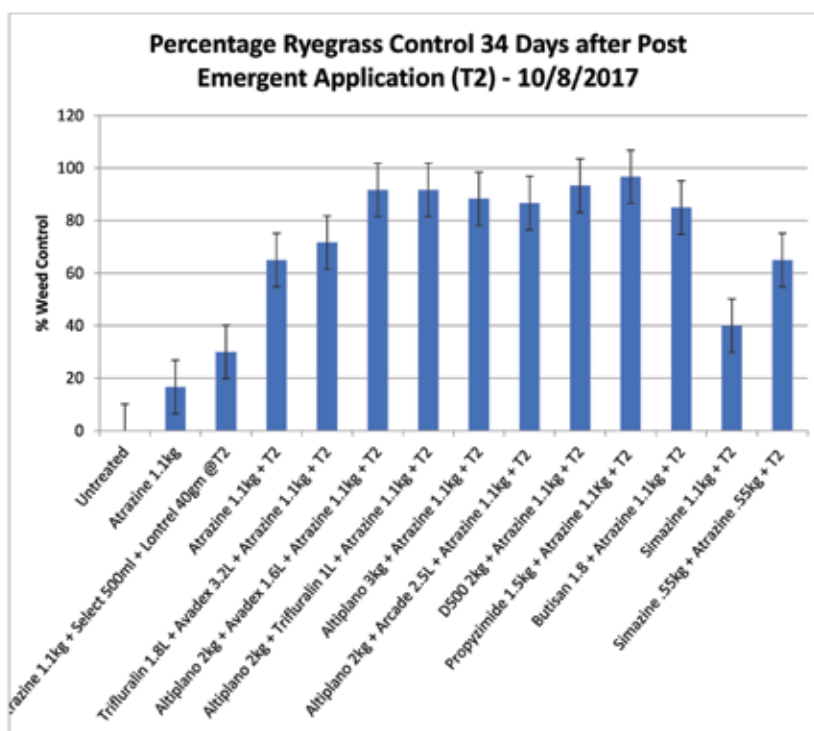


Figure 2. Ryegrass control (% of untreated) 34 days after T2.

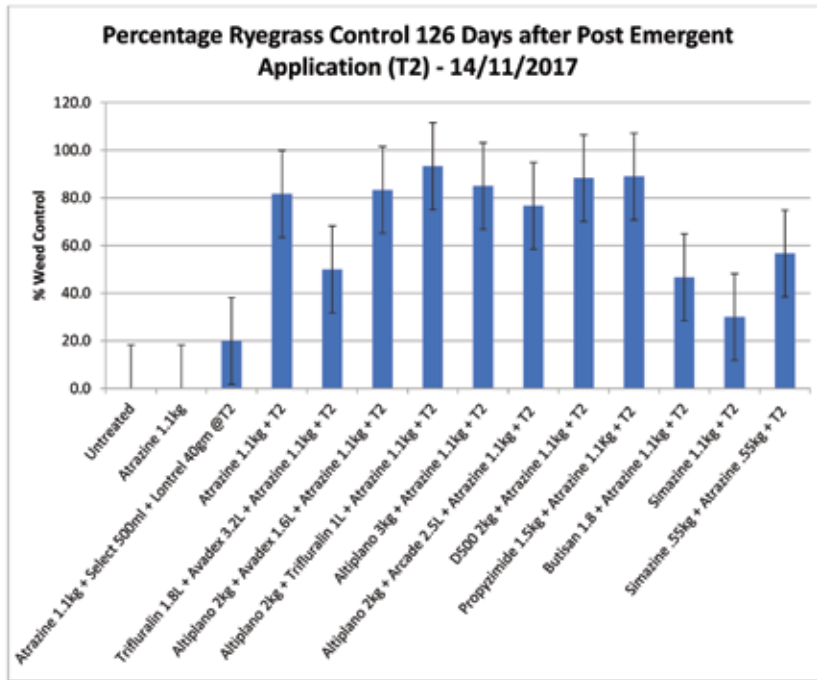


Figure 3. Ryegrass control (% of untreated) 126 days after T2.

### Wild Radish

Wild Radish Control was assessed at 34 days post T2 application and all treatments with T2 application provided significantly better control when compared to the untreated control (Figure 4). All treatments gave commercially acceptable control of wild radish although the Atrazine 1.1kg incorporated by sowing was significantly lower than all other treatments.

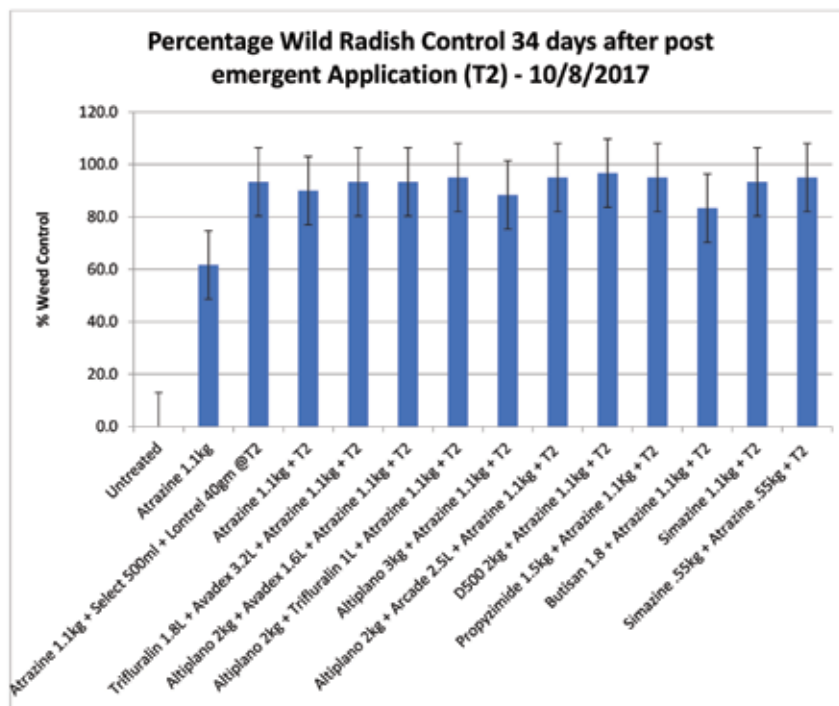


Figure 4. Wild Radish control (% of untreated) 34 days after T2.

## Yield Results

Although plots were harvested, there had been significant damage due to vermin resulting in highly variable and inconsistent data. As such the yield data has not been presented.

## Conclusions

Resistant weeds are an increasing threat to farm productivity and profitability, knowing the resistance status of weeds, especially ryegrass, will improve management with new and existing herbicide chemistry.

Incorporating alternative herbicide modes of action can improve ryegrass control especially where Group D resistance is suspected or known.

## DISCLAIMER

Experimental products and rates have been used within this trial. Products and rates applied within this trial do not constitute a recommendation and the use of unregistered agricultural products is not endorsed by Elders Limited, MFMG or their employees.

The label should be consulted prior to the application of all agricultural products and applied as per label instructions.

## ACKNOWLEDGEMENTS

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