

Controlling ryegrass in the southern Mallee



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Take home messages

- *Group D resistance will develop if trifluralin is consistently used without other control practices.*
- *Trifluralin used in combination with other herbicides such as Avadex Xtra (Group E) and Dual Gold (Group K), may enhance ryegrass control and could prolong the onset of Group D resistant ryegrass populations.*
- *BoxerGold was very effective on both sites with added crop safety. This herbicide is expected to be released in 2008 and likely to be expensive but should be included in the crop rotation to reduce the likelihood of developing resistance.*
- *A knockdown herbicide, such as Roundup, will reduce the pressure on the pre-emergent herbicide and will also prolong the usefulness of these herbicides.*
- *Test ryegrass population to quantify the resistance status of pre-emergent chemicals.*

Background

With the increased use of in-crop selective herbicides for the control of annual ryegrass, there have been more incidences of ryegrass resistance appearing. Currently, there is confirmed resistance to many of the in-crop selective herbicides in Groups A and B and also to pre-emergent selective herbicides such as trifluralin (Group D) and non-selective herbicides such as glyphosate (Group M).

The reduction in efficacy of Group A and B herbicides due to resistance has led to a greater reliance on trifluralin. A recent survey across Victoria, undertaken by Peter Boutsalis, found high levels of resistance to Glean® and Hoegrass®. In 2005, 125 random ryegrass samples were taken across the Wimmera and Mallee region. Over half of these ryegrass samples were resistant to Glean and over a third to Hoegrass. In the Mallee, 7 percent were resistant to trifluralin compared to 2 percent in the Wimmera. In South Australia, almost half of the samples were found to have resistance to trifluralin at 200g of active ingredient but only 14 percent were resistant to higher rates of trifluralin (400g active). Results like these mean farmers have to take action now and develop strategies to manage herbicide resistance.

Tank-mixing trifluralin with herbicides from other groups may improve efficacy and slow the development of resistance to trifluralin and provide an alternative for managing Group A resistant ryegrass populations.



In 2008, Syngenta will release an alternative pre-emergent herbicide to trifluralin called BoxerGold®. BoxerGold has new chemistry containing prosulfocarb (Group E) and S-metolachlor (Dual Gold®, Group K) and has activity on most resistant ryegrass populations. It also has excellent crop safety for both wheat and barley.

Nufarm also have several new pre-emergent herbicides being evaluated for the control of grass weed species. Work is taking place in the Wimmera and Mallee in a variety of broadacre crops. The process to gain registration is a time-consuming and expensive exercise.

Aim

The aim of this trial was to investigate pre-emergent trifluralin mixes for the control of Group A resistant ryegrass.

The trial was conducted at the BCG Herbicide Resistance site, 25km north of Birchip on the Warne road, Jil Jil. The site has confirmed resistance to Group A (Fop) herbicides (eg. Hoegrass).

A second trial investigated pre-emergent herbicide options for a paddock with confirmed trifluralin resistance at Culgoa. This site was not carried through to grain yield to prevent seed set of the resistant ryegrass.

Method

Location:	Jil Jil	Culgoa
Replicates:	Four	Four
Treatments:	Eight	Eight
Plot size:	3m × 24m	3m × 24m
Crop type:	Barley	Wheat
Variety:	Sloop Vic	Yitpi
Sowing date:	14 May 2007	25 April 2007
Soil type:	Mallee sandy loam	Mallee sandy loam
Target plant density:	150 plants/m ²	150 plants/m ²
Seeder:	Jenke bar (no till, narrow points, 30cm spacing, press wheels)	
Sowing speed:	7.5km/hr	7.5km/hr
Sowing conditions:	Moist, rain during sowing, good rain following, perfect sowing conditions.	Topsoil dry, moisture at depth, good rain following.
Herbicides:	7/5/07 Credit and Bonus® at 1.5L/ha (Glyphosate 540g/L)	



Table 1. Treatment descriptions and costings at Jil Jil.

Treatment number	Product	Rate/ha	Method	Cost (\$/ha)
1	Control			
2	TriflurX	1.5L	IBS*	8.55
3	TriflurX	3.0L	IBS	17.10
4	TriflurX + Dual Gold	1.5L + 0.5L	IBS	22.70
5	TriflurX + Avadex Xtra + Dual Gold	1.5L + 1.6L + 0.5L	IBS	47.10
6	TriflurX + Avadex Xtra	1.5L + 1.6L	IBS	33.00
7	BoxerGold	2.5L	IBS	N/A
8	Triathelete	1.8L	IBS	N/A

NOTE: Prices shown are approximate and will vary.

*IBS = Incorporated by sowing

Table 2. Treatment descriptions and costings at Culgoa.

Treatment number	Product	Rate/ha	Method	Cost (\$/ha)
1	Control			
2	TriflurX	1.5L	IBS	8.55
3	TriflurX	3.0L	IBS	17.10
4	TriflurX + Dual Gold*	1.5L + 0.5L	IBS	22.70
5	TriflurX + Avadex Xtra + Dual Gold	1.5L + 1.6L + 0.5L	IBS	47.10
6	TriflurX + Avadex Xtra	1.5L + 1.6L	IBS	33.00
7	TriflurX + Lexone	1.5L + 180g	IBS	16.10
8	BoxerGold	2.5L	IBS	N/A

NOTE: The use of Dual Gold above 0.25L/ha is not registered in wheat and was used in this research only to demonstrate the effect of this mix on ryegrass control. When using any of these herbicides always follow the instructions on the registration label.

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The density of ryegrass plants was assessed by counting the number of plants per square metre when the crop was at the 4-5 leaf stage, and ryegrass at 2-leaf.

A knockdown herbicide (glyphosate) was applied to control early germinating weeds at Jil Jil. The Culgoa site did not require a knockdown prior to sowing.

Results

Figure 1 illustrates that trifluralin significantly reduced ryegrass numbers by 60 percent when measured on 25 June. Where trifluralin had been applied, most of the ryegrass was found in the crop row or just on the edge, where there was no chemical present. Increasing the rate of TriflurX from 1.5L/ha to 3.0L/ha further improved ryegrass control.

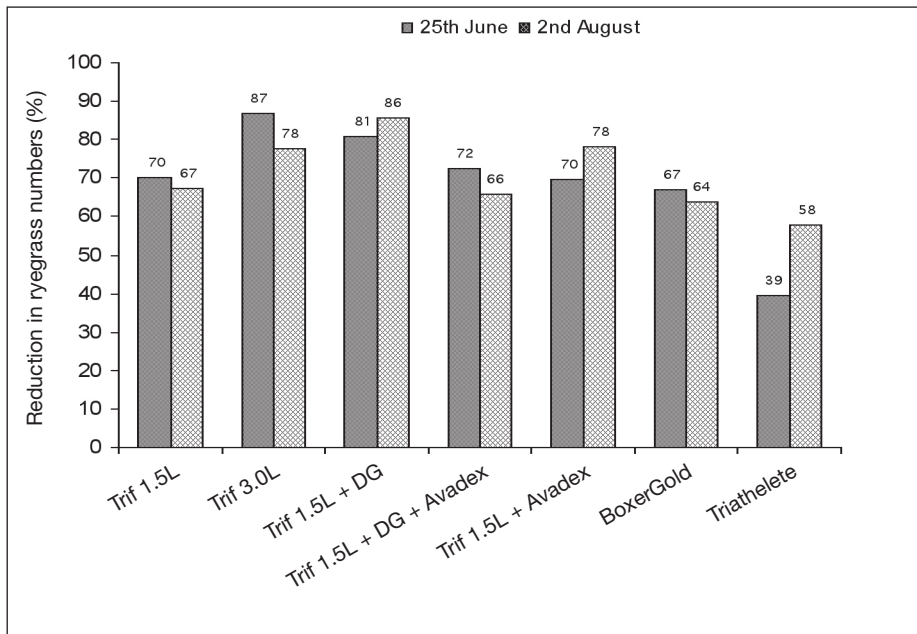


Figure 1. The reduction in ryegrass numbers, expressed as a percentage of the control, for two timings (25 June and 2 August) at the Jil Jil site.

At Culgoa, trifluralin was not as effective and only reduced ryegrass numbers by 32 percent (Figure 2). However, further reductions were found when chemicals with different modes of action (MODs) were added to the mix. BoxerGold had excellent control, reducing ryegrass numbers by greater than 75 percent with the majority of ryegrass found in the crop row.

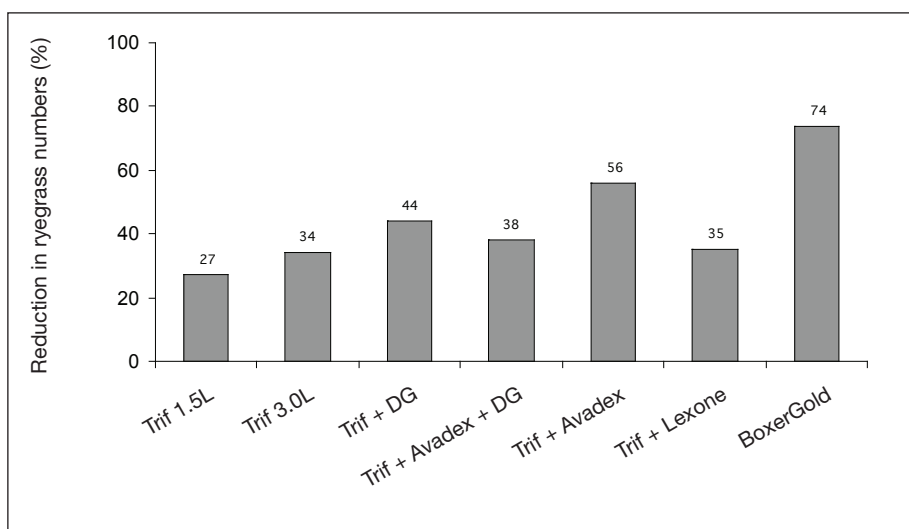


Figure 2. The effect of pre-emergent herbicides on ryegrass control at Culgoa as of 30 May 2007

There was no significant effect on barley grain yield from the competition of ryegrass (Table 3). In terms of grain quality, no differences were recorded in retention or screenings between the treatments at harvest.

Interpretation

Optimum conditions at the time of sowing resulted in excellent uniform germination of ryegrass across the trial. Pre-emergent herbicides such as trifluralin work extremely well when incorporated into moist soils. As in the case of this trial, conditions were ideal and a significant reduction in ryegrass numbers was achieved where pre-emergents were used. The surviving ryegrass numbers were found in the crop-row and were later out-competed by the crop. It would be expected with 30cm row spacing that the crop competition in the inter-row would be less in an average to wet year and subsequently more ryegrass plants would have put up heads.



Table 3. Wheat and ryegrass results at Jil Jil.

Treatment	Barley Plant Density (per m ²)	Barley yield (t/ha)	Ryegrass seed heads at harvest (heads/m ²)
Control	116	2.6	28.9
TriflurX (1.5L/ha)	115	2.7	7.5
TriflurX (3.0L/ha)	115	2.5	3.1
TriflurX + Dual Gold (0.5L/ha)	122	2.5	0.8
TriflurX + Dual Gold + Avadex Xtra	98	2.5	5.6
TriflurX + Avadex Xtra (1.6L/ha)	110	2.6	1.4
BoxerGold (2.5L/ha)	99	2.5	2.2
NUL1479 (1.8L/ha)	105	2.6	1.7
Significant difference	NS	NS	S
LSD <0.05		0.3	10.9
CV(%)		10.8	56.7

The addition of Avadex Xtra failed to improve ryegrass control whereas the addition of Dual Gold seemed to work well and further reduce ryegrass number by 10 percent.

New chemistry such as BoxerGold proved to be as effective as trifluralin with excellent ryegrass control and crop safety. At Culgoa, BoxerGold was twice as effective as trifluralin.

Commercial Practice

It is important to consider the consequences of allowing resistance to develop and how it may alter your farming system. If the ryegrass population becomes resistant regardless of the density, then reducing the seed bank must be the priority. This means getting a good kill at every opportunity. Long-term management strategies should consider the use of non-selective herbicides and non-chemical options such as cultivation and hay production. Problem paddocks need to be identified and monitored at the start and end of every growing season. This monitoring will help you to understand how your management of the ryegrass population is progressing.

Pre-emergent herbicide use is a vital part of most cropping systems and needs to be well planned and executed. It is important to understand how products work and how other factors such as soil and climate will affect the likely outcome. Resistance to trifluralin is difficult to diagnose in the paddock because of interactions with stubble and the volatile characteristics of the chemical. If it is suspected, a laboratory test needs to be carried out to confirm the status of resistance.

Mixing trifluralin with products such as Avadex Xtra and Dual Gold has shown to have varying levels of additional control on ryegrass over the past four years. As it is an expensive option, it is critical that the risk of low efficacy be understood before using these types of mixes.