

# Pre-emergent herbicide options for controlling ryegrass, Jil Jil, Southern Mallee

**Simon Craig (BCG) and Tom Lord (CropFacts)**

BCG investigates pre-emergent trifluralin mixes for the control of Group A resistant ryegrass.

## Take Home Messages

- Group A resistant ryegrass populations are becoming more prevalent across south Australia, increasing the reliance on the use of Group D (trifluralin) for ryegrass control.
- 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.
- A new pre-emergent herbicide KIH-485 (Group K) is being investigated as an alternative ryegrass control option (has some activity on resistant populations) with no crop effect. This product is most likely 5-6 years away from registration.

## Background

With the increased use of in-crop selective herbicides for the control of annual ryegrass, there have been more incidences of ryegrass resistance appear. Currently, there is confirmed resistance to many of the in-crop selective herbicides (in Groups A and B), but also to pre-emergent selective herbicides such as trifluralin (Group D) and non-selective herbicides such as Roundup (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 in Victoria found high levels of resistance to Glean and Hoegrass. In 2005, 125 random ryegrass samples were taken across the Wimmera and Mallee region. Over 50% of these ryegrass samples were resistant to glean and 35% to Hoegrass. In the Mallee, 7% were resistant to trifluralin compared to 2% in the Wimmera. In South Australia, 49% of samples were found to have resistance to the trifluralin (at 200g active) however, only 14% were resistant to higher rates (400g active) of trifluralin. Results like these means 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.

Preliminary studies have indicated KIH-485 (Group K), a pre-emergent herbicide developed by Kumiai Chemical Industry Co. Ltd for the use in corn in the US, could be used as an alternative to trifluralin for controlling annual ryegrass in cereal crops in Australia. KIH-485 is taken up by the roots and disrupts the synthesis of fatty acids within the plant.

The chemical has activity on resistant ryegrass, including Group D resistant populations. It is less volatile than trifluralin and is mobile within soils. Follow-up rain is still required as with most pre-emergent group K herbicides. Trial work on this product has only just commenced in

Victoria, SA and WA. Further trial work will continue looking at a range of scenarios including timing and the effect of incorporation, soil type and moisture. It is likely that KIH-485 will not be registered in wheat for at least 5 years.

Nufarm also have several new pre-emergent herbicides being evaluated for 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 fluralin 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 (e.g. Hoegrass).

## Method

Location:	Jil Jil (25km due north of Birchip)
Replicates:	4
Treatments:	8
Plot size:	3m × 24m
Crop Type:	Wheat
Variety:	Yitpi
Sowing Date:	14 <sup>th</sup> May 2006, No-Tilled
Soil Type:	Mallee Sandy Loam
Seeding Density:	175 plants/m <sup>2</sup>
Seeder:	Jenke bar (No Till, narrow points, 22.5cm spacing, press wheels)
Sowing Speed:	6km/hr
Sowing Conditions:	Surface dry and dusty, moisture at 5 cm
Fertiliser:	Granulock 10Z (55kg/ha),(N 11%,P 21.5%,S 4%,Zn 0.5%)
Herbicides:	4/5/06 Roundup PowerMax® (1.5L/ha)
Paddock history:	2003, Lentils- paddock was cultivated in December 2003 2004, Cereal 2005, pasture was sown and grazed (Ryegrass was a major problem and despite heavy grazing, Roundup was applied to prevent further seed set).

**Table 1:** Treatments (eight), rates, method of application and costing.

Treatment	Chemical	Rate (per ha)	Method	Cost (\$/ha)
1	Control			
2	Triflur X	1.5L	IBS	\$7.95
3	Triflur X	3.0L	IBS	\$15.90
4	Triflur X + Dual Gold	1.5L + 0.5L	IBS	\$20.80
5	Triflur X + Avadex Xtra + Dual Gold	1.5L + 1.6L + 0.5L	IBS	\$44.50
6	Triflur X + Avadex Xtra	1.5L + 1.6L	IBS	\$31.60
7	Triflur X + Lexone	1.5L + 180g	IBS	\$16.20
8	KIH-485*	166g	IBS	N/A

**NOTE:** Prices shown are approximate and will vary, IBS (Incorporated by sowing)

\* This chemical is not registered in wheat and was used for experimental purposes only. When using any of these herbicides always follow the instructions on the registered label.

The density of ryegrass plants was assessed by counting the number of plants per square metre (at the 5-leaf stage of wheat).

## Results

**Table 2:** The influence of herbicide treatments on ryegrass and wheat yield.

Treatment	Rate	Ryegrass (plants/m <sup>2</sup> )	Wheat Yield (t/ha)
Control		6.25	1.75
Triflur X	1.5L	1.25	1.54
Triflur X	3.0L	2.5	1.69
Triflur X + Dual Gold	1.5L + 0.5L	10	1.59
Triflur X + Avadex Xtra + Dual Gold	1.5L + 1.6L + 0.5L	1.9	1.82
Triflur X + Avadex Xtra	1.5L + 1.6L	0.6	1.75
Triflur X + Lexone	1.5L + 180g	6.3	1.67
KIH-485*	166g	3.1	1.65
<b>Significant Difference</b>		<b>NS</b>	<b>NS</b>

**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 instruction on the registration label.

\* This chemical is not registered in wheat and was used for experimental purposes only. When using any of these herbicides always follow the instructions on the registered label.

Ryegrass numbers failed to uniformly germinate across the trial. (This may have been due to previous cultivations distributing ryegrass unevenly throughout the seedbed).

While there were differences in ryegrass density and wheat yield across plots, these differences were not significant and therefore cannot be used to differentiate between treatments. No negative crop effect due to herbicide damage was observed in this study. The trial was harvested on the 20<sup>th</sup> November.

## **Interpretation**

Ryegrass germination was not uniform across the trial, making it difficult to reach many conclusions from this trial.

KIH-485 appears to have potential as an alternative option for the control of annual ryegrass in wheat but will need to be further investigated. Findings from trials in South Australia and Western Australia suggest the best results when using KIH-485 are found when the chemical is incorporated by sowing and at high rates (400g/ha). Industry discussion suggests the rate used in the BCG study (166g/ha) is likely to be the registered rate.

Where trifluralin was not used and crop not sown (at the edge of the trial), there was an abundance of ryegrass plants. Due to the poor growing season conditions and the lack of vigour of the ryegrass, it was observed that the competition from the crop was enough to suppress most of the ryegrass in this trial. This trial did not show any benefit in adding other expensive herbicides, due to no significant difference in ryegrass germination results across the plots. The differences observed between TriflurX 1.5L/ha (1.54t/ha) and TriflurX 1.5L/ha plus the addition of Avadex Xtra and Dual Gold (1.82t/ha) are due to the natural variation across the trial and not the herbicides.

Although not evident in this trial, previous BCG work has found trifluralin and related Group D herbicides are effective in controlling Group A resistant ryegrass. BCG have conducted trials since 2003 looking at similar herbicides (see previous manuals).

## **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 that you understand how the product you are using works 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 its volatile characteristics. 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 have shown to have varying levels of additional control on ryegrass over the past 4 years. However it is a very expensive option as seen in Table 1, it is critical that risk of lack of efficacy be understood before using these types of mixes.