

## Control of annual ryegrass with pre-emergence herbicides

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### Key findings

- All pre-emergent herbicides provided excellent early control of ryegrass ( $\geq 86\%$ ) & good crop safety under the knife-point press wheel system
- Combination of trifluralin & Avadex Xtra followed by PSPE Boxer Gold provided greatest residual control, controlling more than 98% of ryegrass 12 weeks after sowing
- Boxer Gold applied PSPE has been shown to provide some additional in-row control of ryegrass

### Why do the trial?

Given the importance placed on trifluralin for controlling annual ryegrass under current farming practices & growing incidence of ryegrass resistant to this Group D herbicide, there is an urgent need to identify alternate pre-emergent herbicide options. Consequently trials have been undertaken over several seasons (2003 to present) at the Hart field site to evaluate the efficacy & crop safety of alternate pre-emergent herbicides & their mixtures for the control of ryegrass in wheat.

### How was it done?

**Plot size** 1.75m x 12m      **Fertiliser** DAP Zn 2% @ 70kg/ha  
**Seeding date** 30<sup>th</sup> of May 2012      **Variety** Gladius wheat

The trial was established as a randomised complete block design with 3 replicates & 12 herbicide treatments (Table 2). Active ingredients of the herbicides used in the trial are listed in Table 1.

To ensure even annual ryegrass (ARG) establishment across the trial site ARG seed was broadcast at 25kg/ha ahead of seeding & tickled in with a shallow pass with the seeder prior to herbicide application. The ryegrass was previously harvested from commercial paddocks and is approximately 30% resistant to trifluralin.

A standard knife-point press wheel system was used to sow the trial on 22.5cm (9") row spacings.

Pre-sowing herbicides were applied within an hour of sowing & incorporated by sowing (IBS) the post-sowing pre-emergence (PSPE) herbicides were applied on the 31<sup>st</sup> May.

*Table 1. Pre-emergent herbicides & their active ingredients*

Herbicide	Active ingredients
Trifluralin 480	trifluralin 480g/L
Avadex Xtra	tri-allate 500g/L
Boxer Gold	S-metolachlor 120g/L + prosulfocarb 800g/L
Sakura	pyroxasulfone 850g/kg
Dual Gold	S-metolachlor 960g/L

*Table 2. Pre-emergent herbicides, rates & timings at Hart in 2012.*

Treatments	Cost (\$/ha)
1 Nil (untreated control)	
2 Trifluralin 480 1.5L/ha (IBS)	\$8
3 Avadex Xtra 3.0L/ha (IBS)	\$27
4 Sakura 118g/ha (IBS)	\$38
5 Boxer Gold 2.5L/ha (IBS)	\$33
6 Trifluralin 480 1.5L/ha + Avadex Xtra 2.0L/ha (IBS)	\$26
7 Experimental 1 (IBS)	N/A
8 Avadex Xtra 2.0L/ha + Boxer Gold 2.5L/ha (IBS)	\$51
9 Avadex Xtra 2.0L/ha + Sakura 118g/ha (IBS)	\$56
10 Trifluralin 480 1.5L/ha + Avadex Xtra 2.0L/ha + Dual Gold 0.5L/ha (IBS)	\$33
11 Trifluralin 480 1.5L/ha + Avadex Xtra 2.0L/ha (IBS) + Boxer Gold 1.5L/ha (PSPE)	\$46
12 Boxer Gold 2.0L/ha (IBS) + Boxer Gold 1.5L/ha (PSPE)	\$46

## Results

Table 3. Effect of different pre-emergence herbicides on ryegrass plant & head density (plants per square metre) at Hart, 2012. Values in brackets are % control relative to unsprayed nil.

Herbicide treatments	Annual ryegrass				
	July		Aug		Oct
	—plants/m <sup>2</sup> (% control)—		—heads/m <sup>2</sup> —		
Nil	174	-	254	-	254
Trifluralin	20	(89)	52	(80)	56
Avadex Xtra (AX)	7	(96)	37	(85)	35
Sakura (Sak)	25	(86)	31	(88)	6
Boxer Gold (BG)	8	(95)	33	(87)	19
Trif + AX IBS	9	(95)	26	(90)	17
Experimental 1	7	(96)	36	(86)	20
AX + BG IBS	8	(95)	21	(92)	7
AX + Sak IBS	8	(95)	10	(96)	5
Trif + AX IBS + DG PSPE	6	(97)	23	(91)	13
Trif + AX IBS + BG PSPE	2	(99)	4	(98)	7
BG IBS + BG PSPE	2	(99)	11	(96)	0
LSD (0.05)	16		21		22

Annual ryegrass was assessed on the 10<sup>th</sup> of July & 22<sup>nd</sup> of August, 6 & 12 weeks after sowing.

At the first time of assessment (early July) all of the herbicide treatments had significantly reduced ryegrass emergence, averaging 95% control (Table 3). However, by late August differences between the treatments could be measured.

In late August the average ryegrass control across the site was still 90%. At Hart in 2012 the overall performance from all of the pre-emergent herbicides was very good, with all treatments producing over 80% control. The control ranged from 80% (Trifluralin) to 98% (Trifluralin IBS + Avadex Xtra IBS + Boxer Gold PSPE), (Table 3).

In the 2012 Hart trial, treatments giving better than 90% overall control of ryegrass were:

- Trifluralin (480) 1.5L/ha + Avadex Xtra 2.0L/ha (IBS)
- Avadex Xtra 2.0L/ha + Boxer Gold 2.5L/ha (IBS)
- Avadex Xtra 2.0L/ha + Sakura 118g/ha (IBS)
- Trifluralin (480) 1.5L/ha + Avadex Xtra 2.0L/ha (IBS) + Dual Gold 0.5L/ha (IBS)
- Trifluralin (480) 1.5L/ha + Avadex Xtra 2.0L/ha (IBS) + Boxer Gold 1.5L/ha (PSPE)
- Boxer Gold 2.0L/ha (IBS) + Boxer Gold 1.5L/ha (PSPE)

The exact same treatments also produced the best ryegrass control in 2011. All herbicide treatments containing only one product gave significantly poorer control of ryegrass.

Final ryegrass head numbers were significantly greater (more than 30 heads per square metre) for the trifluralin and Avadex Xtra treatments when applied alone (Table 3). Treatments that included a PSPE application or Sakura had a final head number below 10 heads per square metre.

The final grain yield of wheat was not significantly different between the herbicide treatments, averaging 2.5t/ha.

In summary, the trial has again shown there are a number of effective pre-emergent herbicide options available for the effective control of Group D resistant ryegrass. Although these herbicides provide an alternative mode of action to trifluralin, they should be used in conjunction with robust management strategies that use a diverse rotation of crops, herbicides and non-chemical strategies (eg. chaff carts) so as to prolong the life of existing and new chemical groups against ryegrass.

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