

## Integrated weed management

This trial is funded by the GRDC and conducted in collaboration with Birchip Cropping Group and the University of Adelaide

### Key findings

- The seed catcher treatment reduced the ryegrass seed bank from 2007 most effectively
- Delaying sowing in 2008 from the 29<sup>th</sup> May until the 6<sup>th</sup> June decreased the ryegrass population by 55%.

### Why do the trial?

To combine existing knowledge with new techniques for effective integrated weed management to control herbicide resistant ryegrass.

### How was it done?

<b>Plot size</b>	35m x 13m	<b>Fertiliser</b>	DAP @ 75kg/ha + 2% Zn Canola post emergent
<b>Seeding date</b>	TOS 1 29 <sup>th</sup> May 2008 Delayed sowing 6 <sup>th</sup> June 2008		Nitrogen 4 <sup>th</sup> July Urea @ 100kg/ha
<b>Autumn Tickle</b>	24 <sup>th</sup> April 2008		

This trial was a randomised split block design with 3 replicates. It has 4 blocks of additional management practice (nil treatment, delayed sowing, autumn tickle or seed catcher) and 6 management treatments (Table 1). These treatments include low and high sowing rates in combination with low or high use of pre-emergent herbicides

Table 1: Management treatments applied in 2008.

2007 crop	2008 crop	2008 crop emergence plants per sq m	Pre-emergent herbicides
Kalka durum	Correll wheat	186	Trifluralin 480 1.2L/ha
Kalka durum	Correll wheat	196	Trifluralin 480 1.2L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha
Kalka durum	Correll wheat	252	Trifluralin 480 1.2L/ha
Kalka durum	Correll wheat	259	Trifluralin 480 1.2L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha
Buckley hay	TT Tornado canola	57	Trifluralin 480 1.2L/ha
TT Tornado canola	Correll wheat	194	Trifluralin 480 1.2L/ha

The additional management practices were:

- Nil treatment - no additional weed management
- Delayed sowing - these blocks were sown 8 days later
- Autumn tickle - blocks were shallow cultivated using 50mm (2") chisel points on 225mm (9") spacing on the 24<sup>th</sup> April
- Seed catcher - chaff and straw was collected during the previous harvest

This trial was established in 2007. The previous crops are listed in Table 1. Annual ryegrass was broadcast at 25kg/ha and incorporated by sowing. In 2007 the pre-emergent herbicides were applied according to the management treatments in Table 1. The only additional management practice in 2007 was the use of a seed catcher at harvest on selected blocks.

The canola was sprayed with standard post-emergent selective herbicides which gave 100% ryegrass control.

The hay was cut with a walk behind slasher and residues removed from the plot, no ryegrass or wheat re-grew after the hay cut.

In late Autumn 2008, soil samples (0-10cm) were taken from the nil and seed catcher additional treatments to measure the amount of ryegrass in the seed bank.

A ryegrass germination prior to sowing in 2008 was sprayed out with a knock down herbicide combined with the pre-emergent herbicide treatments.

Crop emergence was measured by counting plants along 2m of row, per plot.

Ryegrass was counted with 0.1 square metre quadrats at 5 sites (total 0.5m<sup>2</sup>) within each plot.

## Results

### 2007

Using the seed catcher significantly reduced the seed bank population by an average of 50% compared to the nil treatment (Table 2).

The management treatments used in 2007, such as higher sowing rates or more pre-emergent herbicides had no influence on the ryegrass seed bank.

Table 2: Viable ryegrass in the seed bank in Autumn 2008 at Hart.

2007 crop	Plants per sq m	Pre-emergent herbicides	Viable ryegrass in seedbank 2008	
			Nil treatment	Seed catcher
Kalka	200	Trifluralin 480 0.8L/ha	197	74
Kalka	200	Trifluralin 480 0.8L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha	134	95
Kalka	300	Trifluralin 480 0.8L/ha	172	88
Kalka	300	Trifluralin 480 0.8L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha	261	50
Buckley hay	200	Trifluralin 480 0.8L/ha	113	156
TT Tornado	80	Trifluralin 480 0.8L/ha	164	57
LSD (0.05)	Seed catcher at harvest			23
	Herbicide			ns
	Herbicide*Seed catcher			55

## 2008

### Ryegrass results:

Dry conditions in the years 2007 and 2008 meant that the ryegrass population across the entire trial site was very low. The highest average ryegrass population recorded in July 2008 was 18 plants per square metre.

Wheat at 186 plants per square metre with Trifluralin 480 at 1.2L/ha gave the poorest control of ryegrass (Table 3). Ryegrass control was improved with the addition of extra pre-emergent herbicides by 54% irrespective of other treatments. Increasing the crop density also reduced ryegrass emergence, regardless of pre-emergent herbicide. Increasing the crop density as well as using additional pre-emergent herbicides increased control to 73%. Using a break crop in 2007 also significantly reduced the ryegrass population.

Delaying sowing by 7 days in 2008 reduced the ryegrass population by 55% for all herbicide treatments and break crops, this was the best additional management strategy for reducing ryegrass the population (Table 3). Although the seed catcher was able to reduce the viable ryegrass seed bank numbers (Table 2), there was little difference between the autumn tickle and seed catcher in ryegrass establishment.

Table 3: Crop and ryegrass establishment on 23<sup>rd</sup> July for 6 management treatments across 4 additional management practices at Hart in 2008.

2007 crop	2008 crop	Pre-emergent herbicides	Crop emergence plants per sq m	No treatment	Ryegrass emergence Autumn tickle	Delayed sowing	Seed catcher	Management average
Kalka durum	Correll wheat	Trifluralin 480 1.2L/ha	186	18	15	12	13	15
Kalka durum	Correll wheat	Trifluralin 480 1.2L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha	196	9	10	2	7	7
Kalka durum	Correll wheat	Trifluralin 480 1.2L/ha	252	13	7	5	7	8
Kalka durum	Correll wheat	Trifluralin 480 1.2L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha	259	5	3	2	3	3
Buckley hay	TT Tornado canola	Trifluralin 480 1.2L/ha	57	3	10	3	18	9
TT Tornado canola	Correll wheat	Trifluralin 480 1.2L/ha	194	8	3	3	2	4
Additional management average				9	8	4	8	
LSD (0.05)	Additional Management		ns			4		
	Management		25			3		
	Additional management*Management		ns			8		

### Grain yield results:

The only treatment that had any significant influence on wheat grain yield was the pre-emergent herbicide treatment (Table 4). Although the addition of extra pre-emergent herbicides increased the control of ryegrass it reduced wheat grain yield by 11% in 2008.

Table 4: Wheat grain yield (t/ha) for pre-emergent herbicide treatment.

Pre-emergent herbicides	Wheat grain yield (t/ha)
Trifluralin 480 1.2L/ha	1.18
Trifluralin 480 1.2L/ha + Avadex Xtra 1.2L/ha + Dual Gold 0.35L/ha + Logran 10g/ha	1.05
LSD (0.05)	0.13

The average canola grain yield for the IWM trial at Hart in 2008 was 0.05t/ha.