

## Crop topping cereals for annual ryegrass 2007

Funded by the GRDC in collaboration with the Birchip Cropping Group and the University of Adelaide.

### Key Findings:

- Glyphosate and glufosinate applied to flowering annual ryegrass give better control compared to later applications. While paraquat and diquat can be applied later.
- Paraquat 0.8L/ha or glyphosate 2.0L/ha applied to flowering ryegrass gave over 90% control of viable seed set per head.
- Glyphosate at 1.0L/ha or glufosinate above 2.0L/ha gave more than 65% control of ryegrass seed heads.
- Herbicides applied to barley at the soft or firm dough stage of grain fill did not reduce grain number, weight or viability.

### Why do the trial?

To investigate the effect of crop topping cereals for annual ryegrass control with non-selective herbicides.

Crop topping is a highly successful and widely used practice for pulse crops, but little or no work has been done on wheat or barley. This strategy offers another tool for controlling annual ryegrass, while reducing the development of herbicide resistance particularly for early maturing varieties or seasons.

### How was it done?

A site was selected within a commercial grower paddock of Flagship barley. The area had an even distribution of annual ryegrass.

Herbicide treatments were applied by hand boom to 1.5 \* 5m plots.

Herbicide treatments:

- |                                  |                                  |
|----------------------------------|----------------------------------|
| - Nil                            | - paraquat 0.8L/ha + wetter 0.1% |
| - glyphosate 1.0L/ha             | - Boxer Gold 2.5L/ha             |
| - diquat 1.5L/ha + wetter 0.1%   | - diquat 2.5L/ha + wetter 0.1%   |
| - diquat 3.5L/ha + wetter 0.1%   | - glufosinate 1.0L/ha            |
| - glufosinate 2.0L/ha            | - glufosinate 3.0L/ha            |
| - paraquat 1.6L/ha + wetter 0.1% | - glyphosate 2.0L/ha             |

Herbicide timings:

**Ryegrass flowering** - applied on the 19<sup>th</sup> October 2007. Temperature 19°C, Delta T 8.6, Relative humidity 30%.

The barley was at soft dough, and the head was at 52% moisture

Some ryegrass had flowered, some anthers were still in place, no seed was formed.

**Ryegrass seed formed** – applied on the 7<sup>th</sup> November 2007. Temperature 20°C, Delta T 7.6, Relative humidity 41%.

The barley was at firm dough, a dent made by a finger nail doesn't spring back.

The ryegrass seed was full, at soft to firm dough.

**Sampling and assessment** – All plots were sampled at maturity. Random head samples were cut from 10 sites within each plot, such that at least 100 ryegrass and 20 barley heads were collected. Whole heads were planted in trays of soil, and ryegrass emergence assessed fortnightly. Barley grain was assessed in petri dishes using 100 grains.

## Results

Herbicides applied to annual ryegrass at flowering have a much greater effect compared to later, when the ryegrass seed had formed. The exception was paraquat at either application rate.

At flowering, paraquat at a normal or double rate, and glyphosate at a double rate gave over 90% control of viable seed set per ryegrass head (Table 1).

Glyphosate at 1.0L/ha or glufosinate above 2.0L/ha gave more than 65% control. Boxer Gold, and diquat gave significantly poorer control.

Table 1. The effect of herbicide treatments applied to flowering annual ryegrass on head number, seed emergence and viable seed per head.

FLOWERING Herbicide Treatment	Head number	Total seeds emerged	Viable seed per head	
			Seed no	% control
Nil	145	2197	14.2	0
paraquat 0.8L/ha	165	191	1.2	92
glyphosate 1.0L/ha	172	546	3.7	74
Boxer Gold 2.5L/ha	156	2457	15.6	-10
diquat 1.5L/ha	144	1812	13.4	6
diquat 2.5L/ha	192	2152	11.1	22
diquat 3.5L/ha	129	1274	10.2	28
glufosinate 1.0L/ha	169	1936	11.9	16
glufosinate 2.0L/ha	178	843	4.8	66
glufosinate 3.0L/ha	182	658	3.6	75
paraquat 1.6L/ha	160	21	0.1	99
glyphosate 2.0L/ha	185	147	1.0	93
LSD (P<0.05)	ns	1200	4.65	

Herbicide treatments applied to barley at either the soft dough or firm dough stage of grain fill had no significant impact on grains filled per head, individual grain weight or the germination percentage of the grain. The flowering results are shown in Table 2.

Table 2. The effect of herbicide treatments applied to barley at the soft dough stage of grain fill on grains filled per head, individual grain weight and germination %.

<b>FLOWERING Herbicide Treatment</b>	<b>Grains per head</b>	<b>Grain weight (mg)</b>	<b>Germination (%)</b>
Nil	16.1	43.0	99.3
paraquat 0.8L/ha	17.1	41.5	98.9
glyphosate 1.0L/ha	16.7	42.7	98.5
Boxer Gold 2.5L/ha	17.7	43.8	99.6
diquat 1.5L/ha	16.6	42.7	98.5
diquat 2.5L/ha	16.8	41.8	98.2
diquat 3.5L/ha	15.4	42.2	98.2
glufosinate 1.0L/ha	19.5	42.9	99.3
glufosinate 2.0L/ha	16.7	43.3	99.3
glufosinate 3.0L/ha	17.2	41.1	100.0
paraquat 1.6L/ha	15.7	40.8	99.6
glyphosate 2.0L/ha	16.6	42.2	99.3
LSD (P<0.05)	ns	ns	ns

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