

Crop topping feed barley for annual ryegrass in 2008

This trial was funded by the GRDC

Key Findings:

- All herbicide treatments reduced grain yield by 13% in TOS 1 and at least 8% in TOS 2.
- Glyphosate (540 g/L) at 3.0L/ha was the only treatment to significantly reduce germination, down to 7% at TOS 1 and 88% at TOS 2.
- For each application timing glyphosate (540 g/L), glufosinate (200g/L) and paraquat (250g/L) significantly reduced the germination percentage of ryegrass.

Why do the trial?

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.

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

How was it done?

Plot size	1.5m x 5m	Fertiliser	DAP @ 60 kg/ha + 2% Zn
Seeding date	6 th June 2008	Application date	TOS 1 8 th October TOS 2 15 th October
Variety	Keel		

Please note that apart from diquat (250g/L), the herbicide treatments used in this trial are not registered for use in barley. This trial was conducted in 2008.

Crop topping barley:

The trial was a randomised complete block design with 3 replicates, 2 times of spraying (TOS) and 7 herbicide treatments.

All plots were assessed for grain yield, test weight, germination and screenings with a 2.2 mm screen.

Herbicide application timing was based on the barley growth stage:

Time of spraying 1 (TOS 1) 8th October

Barley 50% milk, awns turning, and heads still quite green

Whole head moisture (total/wet*100) 55%

Time of spraying 2 (TOS 2) 15th October

Barley firm dough, no milk but moist, leathery, springs back

Whole head moisture 43%

Herbicides were applied with a hand boom with 01-110° flat fan nozzles in 114L water/ha

Herbicide treatments:

- | | |
|--------------------------------|--|
| - Nil | - glyphosate (540 g/L) 0.9L/ha |
| - glyphosate (540 g/L) 1.8L/ha | - glyphosate (540 g/L) 3.0L/ha |
| - glufosinate (200g/L) 3.0L/ha | - diquat (250 g/L) 2.0L/ha + wetter 0.1% |
| - paraquat (250 g/L) 0.9L/ha | |

Crop topping annual ryegrass:

This trial was conducted in a grower's paddock containing annual ryegrass and was a randomised complete block design with 3 replicates, 2 times of spraying (TOS) and 7 herbicide treatments. The herbicide treatments and application were as per the barley trial.

All plots were sampled at maturity and the ryegrass seed was assessed for germination in Autumn.

Herbicide application timing was based on the ryegrass growth stage:

Time of spraying 1 (TOS 1) 8th October

Ryegrass beginning to flower, 10% of heads flowering

Time of spraying 2 (TOS 2) 15th October

Ryegrass well into flowering, 20% of heads flowering

Results

Crop topping barley:

All herbicide treatments reduced grain yield by 13% in TOS 1 and at least 8% in TOS 2 (Table 1).

The difference in grain yield between TOS 1 and TOS 2 was not significant except in the case of glyphosate (540 g/L) 1.8L/ha or 3.0L/ha, where there was a 15% increase in grain yield from delaying application until TOS 2 (Table 1).

Glufosinate (200g/L) 3.0L/ha produced the greatest yield losses in both application timings, 27% in TOS 1 and 20% in TOS 2, though these were not significantly different.

Delaying herbicide application until TOS 2 (October 15th) generally reduced screenings, although it was not significant.

All herbicide treatments significantly increased screenings compared to the nil independent of TOS.

Glyphosate (540 g/L) at 1.8 or 3.0L/ha produced the lowest grain weights and germination percentages for both herbicide application timings (Table 2). For all other treatments grain weight and germination were not affected. Glyphosate (540 g/L) at 3.0L/ha was the only treatment to significantly reduce germination, down to 7% at TOS 1 and 88% at TOS 2.

Table 1: Grain yield (t/ha) and screenings (%) for herbicide treatment and time of spraying (TOS). TOS 1 - 8th October, TOS 2 - 15th October.

Herbicide treatment	Rate (L/ha)	Grain yield (t/ha)		Screenings (%<2.2mm)	
		TOS 1	TOS 2	TOS 1	TOS 2
Nil	0	3.24	3.04	39	55
glyphosate (540g/L)	0.9	2.62	2.80	76	70
glyphosate (540g/L)	1.8	2.42	2.79	91	70
glyphosate (540g/L)	3.0	2.40	2.66	92	69
glufosinate (200g/L)	3.0	2.37	2.65	92	63
diquat (250g/L)	2.0	2.48	2.57	75	60
paraquat (250g/L)	0.8	2.55	2.64	80	62
LSD (0.05)					
TOS		0.14		10	
Herbicide		0.26		18	
TOS*Herbicide		n.s.		n.s.	

Table 2: Grain weight (mg/grain) and germination (%) for herbicide treatment and time of spraying (TOS). TOS 1 - 8th October, TOS 2 - 15th October.

Herbicide	Rate (L/ha)	Grain weight (mg/grain)		Germination (%)	
		TOS 1	TOS 2	TOS 1	TOS 2
Nil	0	35	32	97	99
glyphosate (540g/L)	0.9	30	31	94	96
glyphosate (540g/L)	1.8	28	31	12	92
glyphosate (540g/L)	3.0	29	28	7	88
glufosinate (200g/L)	3.0	27	31	97	96
diquat (250g/L)	2.0	30	31	96	98
paraquat (250g/L)	0.8	29	31	97	97
LSD (0.05)					
TOS		n.s.		2	
Herbicide		3		4	
TOS*Herbicide		n.s.		6	

Crop topping annual ryegrass:

At each application timing Power Max, Basta and paraquat significantly reduced the germination percentage of ryegrass. This matches previous results and highlights the success possible using this strategy (Table 3). The diquat treatments did not reduce the viability of the ryegrass seed.

Table 3: Germination (%) of annual ryegrass for herbicide treatment and time of spraying (TOS). TOS 1 - 8th October, TOS 2 - 15th October.

Herbicide treatment	Rate (L/ha)	Germination (%)	
		TOS 1	TOS 2
Nil	0	52	54
Power Max	0.9	2	2
Power Max	1.8	0	0
Power Max	3.0	2	0
Basta	3.0	2	0
Diquat	2.0	78	66
Paraquat	0.8	14	14
LSD (0.05)			
Herbicide		6	17



*Hart Board Members Jane Adams and Justin Wundke
with a group of Clare High School Ag students
at the Hart Field Day 2009*