Attachment to Final Report DAQ00027 Screening for differential herbicide tolerance in cultivars of winter cereals in NR

Sensitivity of barley and wheat cultivars to herbicides (1999 – 2005)

Steve Walker and John Churchett
Department of Primary Industries and Fisheries, Toowoomba, QLD 4350

Research in southern Queensland has shown that herbicide tolerance differed among the barley and wheat cultivars grown in the Northern Region. Field experiments were at weed-free sites, with comparison of yields from areas sprayed with registered herbicides at the recommended and double rates and untreated control areas for each cultivar. Herbicide rates and crop stages at spraying are presented in the Tables below. Not all cultivars were included in each field trial.

The sensitivity of the cultivars is summarised, using the following symbols, based on the yield responses across all trials:

- S (safe) no significant yield reductions at recommended and double rates in more than two trials
- N (narrow margin) significant yield reductions at double rate in more than one trial, but not at the recommended rate
- x% yield reduction (warning) significant yield reduction at recommended rate in one trial only
- x-y% yield reductions (warning) significant yield reductions at recommended rate in more than two trials

Barley cultivars

The response of 11 barley cultivars to herbicides is summarised in Table 1. Significant yield reductions at the recommended rate were recorded for the following herbicides and cultivars:

- Bromicide 200 – Binalong, 11% in 1 of 4 trials; Gilbert, 10% in 1 of 3 trials; Grimmett, 13% in 1 of 4 trials.
- Cadence – Binalong, 11% in 1 of 4 trials; Grimmett, 11-15% in 2 of 4 trials; Mackay, 7-13% in 2 of 4 trials; Tallon, 8% in 1 of 4 trials.
- MCPA LVE – Cowabbie, 12% in 1 of 3 trials; Grimmett, 16% in 1 of 7 trials; Mackay, 5-16% in 2 of 6 trials; Tallon, 13% in 1 of 7 trials.
- Starane – Binalong, 12% in 1 of 6 trials.
- Tordon 242 – Grimmett, 15% in 1 of 6 trials.
- Tordon 75D + 24D – Lindwall, 10% in 1 of 4 trials.
- Tristar Advance – Binalong, 30% in 1 of 3 trials; Mackay, 11-21% in 2 of 3 trials.

Wheat cultivars

The response of 29 wheat cultivars to herbicides is summarised in Table 2. Significant yield reductions at the recommended rate were recorded for the following herbicides and cultivars:

- Ally – Cunningham, 16-21% in 2 of 5 trials; Ellison, 8% in 1 of 4 trials; Giles,18-21% in 2 of 5 trials; Lang, 8% in 1 of 5 trials; Petrie, 7-11% in 2 of 5 trials; QALBis, 12-14% in 2 of 3 trials; Rees, 11% in 1 of 2 trials; Sunco, 17% in 1 of 5 trials; Ventura, 6-10% in 2 of 4 trials; Yallaroi, 18% in 1 of 4 trials. Yallaroi yield was also reduced by 13% in one Central Queensland trial.
- Ally + MCPA LVE – EGA Bellaroi, 9% in 1 of 2 trials.
- Amicide (24D) – Hartog, 9% in 1 of 5 trials.
- Atlantis – Kamilaroi,15% in 1 of 2 trials.
- Bromicide 200 – Baxter, 28% and Yallaroi, 29% in 1 (very dry season) of 4 trials.

- Cadence – Braewood, 18% in 1 of 2 trials; Ventura, 13% in 1 of 3 trials; Hartog 37%, Leichhardt 36%, Strzelecki 38%, Sunstate 38% and Yallaroi 23% in 1 (very dry season) of 3 to 5 trials.

- Glean post-emergence – Petrie, 19% in 1 of 2 trials; Rees, 16% in 1 of 2 trials; Ventura, 15-19% in 2 of 4 trials.
- Hussar - an overall significant yield reduction of 5% across all cultivars in one trial, with greater yield reductions for Baxter, Hartog, Leichhardt, Strzelecki, Sunbrook, Sunco, Sunlin, and Sunstate; Lang, 14% in 1 of 5 trials; Wollaroi, 15% in 1 of 4 trials.

- Mataven 90 applied mid-tillering – Hartog, 7% in 1 of 3 trials; Sunlin, 9% in 1 of 3 trials.

- Mataven 90 applied at the late stage for selective spray topping – Cunningham,14% in 1 of 3 trials; EGA Wylie, 9% in 1 of 1 trial; Ellison, 14-21% in 2 of 3 trials; Kamilaroi, 28% in 1 of 3 trials; Leichhardt, 11% in 1 of 3 trials; Rees, 7% in 1 of 3 trials; Sunbri, 35% in 1 of 2 trials; Sunlin, 14-65% in 5 of 5 trials; Wollaroi, 14-18% in 3 of 4 trials; Yalloroi, 14% in 1 of 5 trials.

- MCPA LVE – EGA Wylie, 22% in 1 of 1 trial; GBA Hunter, 17% in 1 of 1 trial.

- Topik – Sunvale, 13% in 1 of 4 trials.

- Tordon 242 – Petrie, 16% in 1 of 7 trials, with substantial but not significant losses in two other trials.

Five wheat cultivars and four herbicides were tested for one year in Central Queensland. Glean and Ally + MCPA had no effect on Baxter, Kennedy, Lang, Petrie or Yallaroi. Ally at the recommended rate significantly reduced the yield of Yallaroi by 13% and MCPA LVE at double rates significantly reduced the yield of Baxter. In both cases the other four cultivars were unaffected.

These ratings are a guide only. For more information, contact John Churchett on john.churchett@dpi.qld.gov.au or 07 4639 8847.

This research was funded by GRDC and various chemical companies.

Queensland Government
Department of Primary Industries and Fisheries

GRDC
Grains Research & Development Corporation

Table 1. Barley cultivars response to herbicides in southern Queensland.

Cultivar	Achieve (tralkoxydim)	Ally (metsulfuron)	Ally+MCPA (metsulfuron + MCPA LVE)	Amicide 500/625 (24D amine)	Axial 100 EC (pinoxaden)	Bromicide MA (bromoxynil + MCPA)	Bromicide 200 (bromoxynil)	Cadence (dicamba)
Binalong	N	N	S	S	S	S	11	11
Cowabbie	S	S	S*	S	S*	S	S*	N
Fitzroy	N	S*	S*	S*	S*	N		
Gairdner	N	S	S	S	S	N	N	S
Gilbert	S*	N	S*	S	S*		10	N
Grimmett	N	N	S	S	S	N	13	11-15
Grout	S	S	S*	S	S*	N	S*	N
Kaputar	S*	S	S*	S	S*	S*	N	S
Lindwall	S*	N	S*	S	S*	S*	S	N
Mackay	S	S	S	S	S	S	N	7-13
Skiff	S*	S	S*	S	S*		S	S
Tallon	S	N	S	S	S	N	N	8
Tantangara	S	S	S	S	S	S	S	N
Rates (product/ha)	380-430 & 760-860g/ha	7 & 14g	Ally 7 & 14g MCPA 0.75 & 1.5L	Amicide 500 0.85 & 1.7L Amicide 625 0.65 & 1.3L	150 & 300 mL and 200 & 400 mL	1.4 & 2.8L	1.4 & 2.8L	200 & 400g
Crop stage at spraying	3-5 leaf + 1-3 tiller	3-5 leaf + 1-3 tiller	3-5 leaf + 1-3 tiller	6-7 leaf + 3-7 tiller	3-5 leaf + 1-3 tiller	5-7 leaf + 3-4 tiller	5-7 leaf + 3-7 tiller	4-7 leaf + 2-5 tiller

Cultivar	Decision (diclofop + sethoxydim)	Hotshot (aminopyralid + fluroxypyr)	MCPA LVE (MCPA)	Starane 200 (fluroxypyr)	Tordon 242 (picloram + MCPA)	Tordon 75D + 24D (picloram + 24D)	Tristar Advance (diclofop + fenoxaprop)
Binalong	N	N	N	12	S	N	30
Cowabbie	N	S	12	N	S		S*
Fitzroy	S	S	S	S	S*		
Gairdner	S	N	N	N	S	N	S
Gilbert			N	S	S	N	N
Grimmett	S	S	16	S	15	N	N
Grout	S	S	N	N	S		S*
Kaputar		S*	N	S	S	S	S
Lindwall		S*	N	N	N	10	S
Mackay	S	S	5-16	N	S	N	11-21
Skiff			S	S	S	S	
Tallon	S	N	13	N	S	S	S
Tantangara	S	S	N	S	S	S	S
Rates (product/ha)	1 & 2 L	0.75 & 1.5L	0.75 & 1.5L	1.0 & 2.0L	1.0 & 2.0L	300+470 & 600+940mL	1.5 & 3L
Crop stage at spraying	3-6 leaf + 1-4 tiller	4-7 leaf + 2-5 tiller	4-5 leaf + + 1-3 tiller	5-7 leaf + 3-5 tiller	4-5 leaf + 1-3 tiller	5-7 leaf + 3-5 tiller	2-6 leaf + 1-4 tiller

S* indicates that testing was done in 1 year only with no adverse affects on yield

Table 2. Wheat cultivars response to herbicides in southern Queensland.

Cultivar	Achieve	Ally (metsulfuron)	Ally + MCPA (metsulfuron + MCPA)	Amicide 500/625 (24D amine)	Atlantis (mesosulfuron)	Axial 100EC (pinoxaden)	Bromicide MA (bromoxynil + MCPA)	Bromicide 200 (bromoxynil)	Cadence (dicamba)	Glean (chlorsulfuron)	Glean (chlorsulfuron)	Hotshot (aminopyralid + fluroxypyr
Baxter	S*	N	S*	N	S	S	N	28	N	S		S
Braewood		S		N					18		S	
Cunningham	S*	16-21	S*	S	S	S	N	S	N	N		S
EGA Bellaroi	S	N	9	S	N	S*	S*		S		S	S
EGA Gregory	S	N	N	S*					S*		S	
EGA Hume	S	S	S*	N	S	S	S	S*	N		S	S
EGA Wentworth	S*	S*	S*	S*					N		S*	
EGA Wylie	S	N	S*	S*					S*		S	
Ellison	S	8	S*	N	S	S*			N		S	S*
GBA Combat	S*	S*									S*	
GBA Hunter	S*								N			
GBA Sapphire	S	S*							S*		S*	
Giles	S*	18-21	S*	N	S	N	S	S	S	S		S
Hartog	S*	N	S*	9	S	S	N	S	37	N	S*	S
Kamilaroi	S*	N	S*	S	15	S	S	S	S	S		S
Kennedy	S*	S	S*	S	S	S	N	N	N	N		S
Lang	S*	8	N	S	S	S	S	S	S	N	S	S
Leichhardt	S*	S	S*	N	S	N	S	N	36	S		N
Petrie	S*	7- 11	S	S	S	S	S	S	N	S	19	S
QALBis	S*	12 -14		N					N		S	
Rees	S	11	N	N	S	S*			S*		16	S*
Strzelecki	S*	N	S	S	S	S	N	N	38	S	S	S
Sunbri	S*	N		S	S*	S	S*	S	S	S		S*
Sunbrook	S*	N		S	S*	S	S*	S	S	S		S*
Sunco	S*	17	S*	S	S	S	S	S	S	N		N
Sunlin	S*	S	S*	S	S	S	S	S	S	S		S
Sunstate	S*	S	S*	N	S	S	S	S	38	S		S
Sunvale	S*	N	S*	S	S	N	S	S	S	S		S
Ventura	S	6-10	N	N					13		15-19	
Wollaroi	S*	N	S*	S	S	S	N	S	S	S		S
Yallaroi	S*	18	S*	S	S	S	S	29	23	S		S
Rates (product/ha)	380-430 & 760-860g/ha	7 & 14g	Ally 7 & 14g MCPA 0.75 & 1.5L	Amicide 500 0.85 & 1.7L Amicide 625 0.65 & 1.3L	330 & 660mL	150 & 300 mL and 200 & 400 mL	1.4 & 2.8 L	1.4 & 2.8L	200 & 400g	20 & 40g	20 & 40g	0.75 & 1.5L
Crop stage at spraying	3-5 leaf + 1-2 tiller	3-7 leaf + 1-6 tiller	4-7 leaf + 2-6 tiller	4-7 leaf + 3-9 tiller	2-4 leaf + 1 tiller	3-5 leaf + 1-2 tiller	6-7 leaf + 3-5 tiller	4-7 leaf + 3-7 tiller	3-6 leaf + 1-5 tiller	Pre-plant	3-7 leaf + 1-6 tiller	5-7 leaf 3-5 tiller

S* indicates that testing was done in 1 year only with no adverse affects on yield

Table 2. Wheat cultivars response to herbicides in southern Queensland (continued)

Cultivar	Hussar (iodosulfuron)	Logran (triasulfuron)	Mataven 90 (flamprop)	Mataven 90 (SST) (flamprop)	MCPA 500 (MCPA)	MCPA LVE (MCPA)	Starane 200 (fluroxypyr)	Topik 240EC (clodinafop)	Tordon 242 (picloram + MCPA)	Tordon 75D+24D (picloram + 24D)	Wildcat (fenoxaprop)
Baxter	11	S	S	N		N	N	S	N	S	N
Braewood					S	S	S	S	S		S
Cunningham	N	N	S	14		S	S	S	N	S	S
EGA Bellaroi	N		S	S	S	S	S	S	S		S
EGA Gregory	S*			S*	S*	S*	S*	S*	S*		S*
EGA Hume	S		N	N	S	S	S	S	S		S
EGA Wentworth	S*				S*	N	S*		S*		
EGA Wylie	S*			9	N	22	S*	S*	S*		S*
Ellison	S		N	14-21	S	N	S	S	S		S
GBA Combat				N				S*			S*
GBA Hunter					S*	17			S*		
GBA Sapphire				S*	S*	S*		S*	S*		S*
Giles	N	S	S	N		S	S	N	N	S	S
Hartog	6	S	7	N	S*	S	N	S	S	S	N
Kamilaroi	N	N	N	28		S	N	S	S	S	S
Kennedy	N	N	S	N		S	S	N	N	S	S
Lang	14	S	S	N	S	S	N	S	S	S	S
Leichhardt	6	S	S	11		S	N	S	N	S	S
Petrie	S	S	S	N	S	S	S	S	16	S	S
QALBis				N	S	S	S	S	S		S
Rees	S		N	7	N	S*	S	S*	S*		S*
Strzelecki	6	S	S	S	S	N	N	S	S	S	S
Sunbri	N	S	S*	35		S	S	S	S	S	S
Sunbrook	9	S	S*	S		S	S	S	N	S	S
Sunco	6	N	S	N		S	S	S	S	S	S
Sunlin	8	S	9	14-65		S	S	S	S	S	S
Sunstate	7	N	N	N		S	S	S	N	S	S
Sunvale	N	S	S	N		S	S	13	S	S	S
Ventura	S*			N	S	S	N	N	S		S
Wollaroi	15	S	N	14-18		S	S	S	S	N	S
Yallaroi	S	N	S	14		S	S	N	S	S	S
Rates (product/ha)	200 & 400g	35 & 70g	2.5 & 5.0 L	1.85 & 3.75L	0.75 & 1.5L	0.75 & 1.5L	1.0 & 2.0L	85 & 170mL	1.0 & 2.0L	300+470 & 600+940mL	0.5 & 1.0L
Crop stage at spraying	2-5 leaf + 1-2 tiller	Pre-plant	5-7 leaf + 3-6 tiller	1-9 node	3-4 leaf + 1-2 tiller	3-6 leaf + 1-5 tiller	5-6 leaf + 3-6 tiller	3-5 leaf + 1-2 tiller	4-6 leaf + 1-6 tiller	4-7 leaf + 3-9 tiller	3-5 leaf + 1-2 tiller