

Velocity®- evaluation of a 2 spray strategy for wild radish control

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Purpose:	To evaluate which combination of an early bromoxynil based herbicide and follow up post-emergent herbicide will provide the best weed control and Return on investment (ROI) in a system approach to wild radish control in cereals
Location:	North West Road, Dandaragan
Soil Type:	Sandy loam
Rotation:	2010 Lupins; 2009 Wheat; 2008 Lupins
GSR:	360mm

BACKGROUND

Wild radish is a continual problem weed for most growers in Western Australia, this trial aims to show the advantages of planning for 2 sprays and targeting small weeds to maintain yield potential.

TRIAL DESIGN

Plot size: 2.5 m x 10 m

Repetitions: 3

Crop details: Mace wheat @ 70kg/ha on 23 May 2011

Seed treatments: Raxil® Pro @ 15 mL/100 kg, Gaucho® 350 @ 200 mL/ha

Fertiliser: **At seeding:** Urea top-dressed @ 100 kg/ha, MAPSZC banded @ 100 kg/ha
Post: Urea @ 80 kg/ha (19 July)

Ground cover: 30% lupin and radish stubble, burnt header rows with high ash cover with wild radish to 4 leaf and small ryegrass. RG 200+/ m² (1 leaf - tillering), WR 0-10/m² (2 – 8 leaf)

Herbicide: **Pre:** Roundup® CT @ 1.75 L/ha, Sakura® @ 118 g/ha

Fungicide: Prosaro® 420SC @ 150 mL/ha, Hasten® 1% v/v (12 August)

Post-emergent herbicide treatments:

Spray date A: 10 June @ 80 L/ha

Spray date B: 8 July (28 days after A) @ Water Rate:80 L/ha

Application details- Weeds:

Application A: Wild radish 96/ m²: majority cot to 2 leaf, up to 6 leaf

Vol. lupins 9/ m² (2-4 leaf), Capeweed 7/ m² (Cot-2 leaf)

Application B: Wild radish - Nil Spray A = 78/ m² = majority cot to 4-6 leaf, up to 12 leaf, some flowering Vol. lupins 2 per m² (8 leaf)

Velocity 800 mL/ha = 32 / m² = majority cot

Jaguar 1L/ha = 13 / m² = majority cot, Surviving WR 2 per m² (majority 4 leaf),

SITE COMMENTS

Application A

The wild radish density was of high density (96 /m²) across the site with the highest numbers in the header rows. Spray coverage was good and weed size appropriate for both Velocity 800 mL/ha + Hasten 1 %v/v and Jaguar 1 L/ha. The treatments were applied immediately after rainfall so soil moisture was good and conditions were ideal to get some residual activity from the Jaguar.

Application B

The weeds were very dense and generally large so coverage issues played a big part with the bromoxynil based herbicides giving lower levels of control due to weed size.

Resistance status

Wild radish population in this paddock has been tested for resistance status and confirmed as:

- Highly sensitive to Group I (MCPA) herbicides, with moderate tolerance to Group B (Logran) with some very low tolerance to Group F (Brodal).
- This trial site's radish population would be considered highly susceptible compared to many other farms in this district and across the Western Australian wheatbelt.

Table 1: Herbicide mode of action (MOA) groups

PRODUCT	Herbicide MOA Group
VELOCITY	HC
-PYRASULFOTOLE	
-BROMOXYNIL	
PRECEPT 300	HI
-PYRASULFOTOLE	
-MCPA	
JAGUAR	FC
-DIFLUFENICAN	
-BROMOXYNIL	
TIGREX	FI
-DIFLUFENICAN	
-MCPA	
BUCTRIL MA	CI
-BROMOXYNIL	
-MCPA	

PRODUCT	Herbicide MOA Group
FLIGHT EC	FCI
-PICOLINAFEN	
-BROMOXYNIL	
-MCPA	
DIURON 900 WG	C
-DIURON	
MCPA AMINE	I
-MCPA	
LVE AGRITONE	I
-MCPA	
LOGRAN 750 WG	B
-TRIASULFURON	

RESULTS

Crop Effects

All treatments were safe to Mace wheat in this trial with minor crop flecking recorded from all Group F treatments with symptoms diminishing within a fortnight.

Yield

Table 2: Yield t/ha from Mace wheat and % weight contaminating wild radish from Nil Spray A.

Treatment rate/ha	Spray	Nil Spray A				Velocity 800 mL/ha Spray		Jaguar 1 L/ha Spray A	
		15/11/2011				15/11/2011		15/11/2011	
		t/ha	Yield % of untr	Grade	% WR cont.	t/ha	Yield % of untr	t/ha	Yield % of untr
Untreated	B	3.49 -	100	FED1	6.2 a	4.16 -	119	4.37 -	125
Velocity 670 mL + Hasten 1%	B	4.02 -	115	AUH2	1.0 b	4.23 -	121	4.01 -	115
Velocity 1 L + Hasten 1%	B	4.11 -	118	AUH2	0.4 b	4.21 -	121	4.29 -	123
Velocity 670 mL + Tigrex 500 mL + Hasten 1%	B	4.05 -	116	AUH2	0.4 b	4.31 -	124	4.34 -	124
Velocity 670 mL + Agritane LVE 440 mL + Hasten 1%	B	3.93 -	113	AUH2	0.5 b	4.05 -	116	4.23 -	121
Jaguar 750 mL + Agritane LVE 350 mL	B	4.03 -	116	FED1	1.7 b	4.28 -	123	4.38 -	126
Flight EC 540 mL	B	4.03 -	115	AUH2	0.7 b	4.25 -	122	4.40 -	126
Precept 300 750 mL + Hasten 1%	B	4.06 -	116	AUH2	0.6 b	4.31 -	124	4.18 -	120
Tigrex 1 L	B	3.89 -	112	AUH2	0.7 b	4.28 -	123	4.33 -	124
Diuron 900WG 200 g + MCPA Amine 500 mL	B	3.61 -	103	FED1	1.6 b	4.38 -	126	3.92 -	112
Logran 15 g + Agritane LVE 440 mL + Uptake 0.5%	B	3.98 -	114	FED1	1.2 b	4.04 -	116	4.32 -	124
Mean Yield Spray A + Spray B		3.97	114			4.23	121	4.24	121
LSD (P=Various)		0.63							
Standard Deviation		0.38							
CV		9.27							

Values followed by the same letter do not significantly differ ($P = 0.05$, Duncan's New MRT).

AUH2 Max contaminating grain % = 1.2% of weight. All treatments with a Spray A were considered AUH2.

- None of the yields in this trial were significantly different from the untreated however all treatments applied at Spray B recorded significantly ($P \geq 5\%$) lower contamination from wild radish pods in the sample than the untreated. Pod separation was not conducted on treatments that had either Velocity or Jaguar at spray A All treatments with a Spray A were assumed to be AUH2 for ROI analysis due to the high levels of weed control.
- Velocity 800 mL/ha (4.16 t/ha) applied at application A only recorded a higher yield than Velocity 1 L/ha when applied at application B only (4.11 t/ha), demonstrating the advantages of early weed control in competing with the crop for nutrition.
- The early application of either Velocity at 800 mL/ha or Jaguar at 1 L/ha resulted in an average yield increase over all spray B treatments of 260 kg/ha from Velocity and 270 kg/ha from Jaguar compared to the spray B treatment alone.

Table 3: Yield t/ha, Gross margin and return on investment (\$ROI) from Mace wheat. Note: Mean Spray A + B figures are the average of treatments excluding the untreated for each Spray A treatment block.

		Total cost Spray A = \$0.00			Total cost Spray A = \$33.30			Total cost Spray A = \$18.80		
		Nil Spray A			Velocity 800 mL/ha Spray A			Jaguar 1 L/ha Spray A		
		15/11/2011			15/11/2011			15/11/2011		
Treatment	Product Cost \$/ha	t/ha	\$ Gross Margin	\$ ROI above Unt	t/ha	\$ Gross Margin	\$ ROI above Unt	t/ha	\$ Gross Margin	\$ ROI above Unt
Untreated		3.49	\$631.69	\$0.00	4.16	\$1,023.36	\$358.37	4.37	\$1,075.02	\$443.33
Velocity 670 mL + Hasten 1%	\$24.90	4.02	\$988.92	\$327.33	4.23	\$1,040.58	\$345.69	4.01	\$986.46	\$306.07
Velocity 1 L + Hasten1%	\$34.80	4.11	\$1,011.06	\$339.57	4.21	\$1,035.66	\$330.87	4.29	\$1,055.34	\$365.05
Velocity 670 mL + Tigrex 500 mL + Hasten	\$29.80	4.05	\$996.30	\$329.81	4.31	\$1,060.26	\$360.47	4.34	\$1,067.64	\$382.35
Velocity 670 mL + Agritane LVE 440 mL + Hasten1%	\$29.90	3.93	\$966.78	\$300.19	4.05	\$996.30	\$296.41	4.23	\$1,040.58	\$355.19
Jaguar 750 mL + Agritane LVE 350 mL	\$13.70	4.03	\$729.43	\$79.04	4.28	\$1,052.88	\$369.19	4.38	\$1,077.48	\$408.29
Flight EC 540 mL	\$15.80	4.03	\$991.38	\$338.89	4.25	\$1,045.50	\$359.71	4.40	\$1,082.40	\$411.11
Precept 300 750 mL + Hasten1%	\$26.55	4.06	\$998.76	\$335.52	4.31	\$1,060.26	\$363.72	4.18	\$1,028.28	\$346.24
Tigrex 1 L	\$9.80	3.89	\$956.94	\$310.45	4.28	\$1,052.88	\$373.09	4.33	\$1,065.18	\$399.89
Diuron 900WG 200 g + MCPA Amine 500 mL	\$7.20	3.61	\$653.41	\$9.52	4.38	\$1,077.48	\$400.29	3.92	\$964.32	\$301.63
Logran 15 g + Agritane LVE 440 mL + Uptake 0.5%	\$8.90	3.98	\$720.38	\$74.79	4.04	\$993.84	\$314.95	4.32	\$1,062.72	\$398.33
Mean: Spray A + Spray B		3.97	\$901.34	\$244.51	4.23	\$1,041.56	\$351.44	4.24	\$1,043.04	\$367.42
AUH2		\$246.00								
FED1		\$181.00								
Application Cost		\$5.00								

Total Spray A = Application cost + Product cost + Adjuvant at 80 L/ha

On average both Velocity (\$1,041.56) and Jaguar (\$1,043.04) at spray A recorded comparable Gross margins with Jaguar slightly having the edge for \$ROI over the untreated.

- Velocity 800 mL/ha (\$358.37) applied at application A only recorded a higher \$ROI than Velocity 1 L/ha when applied at application B only (\$339.57 t/ha).

Control of wild radish

Table 4. Wild radish control, 5/9/11, 59 days after application B.

		Spray A		
		Nil Herbicide	Velocity 800 mL/ha	Jaguar 1 L/ha
		5/09/2011	5/09/2011	5/09/2011
		87 DAA	87 DAA	87 DAA
		59 DAB	59 DAB	59 DAB
Treatment rate/ha	Spray	% Control	% Control	% Control
Untreated	B	0	72	80
Velocity 670 mL + Hasten 1%	B	77	93	98
Velocity 1 L + Hasten 1%	B	91	93	98
Velocity 670 mL + Tigrex 500 mL + Hasten 1%	B	96	97	98
Velocity 670 mL + Agritane LVE 440 mL + Hasten 1%	B	95	96	97
Jaguar 750 mL + Agritane LVE 350 mL	B	67	98	96
Flight EC 540 mL	B	77	94	96
Precept 300 750 mL + Hasten 1%	B	88	96	98
Tigrex 1 L	B	78	97	97
DFF 50 mL + Agritane LVE 440 mL + Uptake 0.5%	B	63	96	95
Diuron 900WG 200 g + MCPA Amine 500 mL	B	58	91	92
Logran 15 g + Agritane LVE 440 mL + Uptake 0.5%	B	62	95	93

- On the 10/6/11 just prior to application B being made Velocity 800 mL/ha + Hasten (95%) was marginally ahead of Jaguar 1 L/ha (93%) on initial control of wild radish.
- A final control rating conducted 59 days after spray B showed little difference between the Spray A followed by spray B treatments with only Velocity 800 mL/ha followed by Diuron + MCPA (91%) recording unsatisfactory control ($\leq 92\%$).
- Of the spray B only treatments only Velocity + Tigrex (96%) and Velocity + Agritane (95%) recorded acceptable control ($\leq 92\%$) although Velocity 1 L/ha was close (91%).
- All other treatments were unsatisfactory due to weed size and coverage issues, herbicide rate to weed size and crop density were all factors in the reduced control. Diuron (58%), Homebrew Tigrex (63%) and Logran (62%) mixtures were the worst performing treatments.
- Due to the high numbers and multiple germinations at this site a single application of herbicide would not be recommended. The results from the 2 spray strategy support this for end control.
- Due to the density of the canopy and the weed size at application B a higher water rate 100 L/ha may have improved control but most treatments would still have been unacceptable.

Control of volunteer lupins

Table 5. Volunteer lupin control, 5/9/11, 59 days after application B.

		Spray A		
		Nil Herbicide	Velocity 800 mL/ha	Jaguar 1 L/ha
		5/09/2011	5/09/2011	5/09/2011
		87 DAA	87 DAA	87 DAA
		59 DAB	59 DAB	59 DAB
Treatment rate/ha	Spray	% Control	% Control	% Control
Untreated	B	0	73	70
Velocity 670 mL + Hasten 1%	B	90	97	95
Velocity 1 L + Hasten 1%	B	93	96	98
Velocity 670 mL + Tigrex 500 mL + Hasten 1%	B	92	98	99
Velocity 670 mL + Agritone LVE 440 mL + Hasten 1%	B	95	98	97
Jaguar 750 mL + Agritone LVE 350 mL	B	88	93	93
Flight EC 540 mL	B	87	93	93
Precept 300 750 mL + Hasten 1%	B	87	95	93
Tigrex 1 L	B	83	96	95
DFF 50 mL + Agritone LVE 440 mL + Uptake 0.5%	B	67	90	92
Diuron 900WG 200 g + MCPA Amine 500 mL	B	77	90	93
Logran 15 g + Agritone LVE 440 mL + Uptake 0.5%	B	80	92	91

- On the 10/6/11 just prior to application B being made Velocity 800 mL/ha + Hasten (95%) recorded a higher rating of volunteer lupin control than Jaguar 1 L/ha (85%).
- A final control rating conducted 59 days after spray B recorded little difference between the Spray A followed by spray B treatments.
- Velocity 800 mL/ha followed by Diuron + MCPA (90%) or Homebrew Tigrex (90%) and Jaguar 1 L/ha followed by Logran (91%) recorded unsatisfactory control ($\leq 92\%$).
- Of the spray B only treatments Velocity 1 L/ha (93%), Velocity + Tigrex (92%) and Velocity + Agritane (95%) recorded acceptable control ($\leq 92\%$) although Velocity 670 mL/ha was close (90%).
- All other treatments were unsatisfactory due to weed size or less effective efficacy.
- Diuron (77%), Homebrew Tigrex (67%) and Logran (80%) mixtures were the worst performing treatments.
- Velocity[®], Precept[®] 300, Jaguar[®] & Tigrex[®] are Registered Trademarks of Bayer.

REVIEWED: Craig White, Technical advisor southern WA, Bayer CropScience

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