

Demonstrate the effects of water rate on Velocity® and Jaguar® for the control of Wild Radish



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Aim

To evaluate the effect of water rate using a medium spray quality on bromoxynil based herbicides under conditions where coverage is not optimal; to evaluate the effect of coarse droplets; and to evaluate the effect on wild radish control at different water rates with MCPA in tank mixtures with Velocity®.

Background

Velocity® will control wild radish resistant to Group B, Group F and Group I herbicides. It is registered for control of a wide range of broadleaf weeds and volunteer legumes in wheat, barley, triticale and cereal rye. Velocity® requires good spray coverage of the target weed to achieve optimal results. Some field results below expectation in 2009 were due to low water rates and inappropriate product rate for weed size. Velocity® will be registered at use rates up to 1 L/ha in time for the 2011 season and at use in tank mixtures with MCPA LVE at 500 mL/ha in time for the 2011 season.

Trial Details

Property	Dodd's property, West Buntine
Plot size & replication	2.5 m x 12 m x 3 replicates
Soil type	Sandy Loam
Sowing date	29/5/10
Crop Variety	Magenta
Seeding Rate	80 kg/ha
Seeding depth	3cm
Seeding Equipment	Knife point and press wheels
Paddock rotation	08 Wheat, 09 Canola
Fertiliser	29/5/10 110 kg/ha Agras® + 28/7/10 50 L Flexi N®
Application date	13/7/10
Wild Radish Density	303/m ²
Wild Radish Stage	cotyledon (3%), 2 leaf (6%), 3 leaf (26%), 4 leaf (58%), 5 leaf (7%)
Crop Stage	Z14/ 21
Herbicides, Insecticides & Fungicides	20/5/10 Roundup® CT at 1.8 L/ha + Treflan® 480 at 1.5 L/ha + Logran® at 30 g/ha 25/8/10 Estericide® 680 at 800 mL/ha across the trial
Growing Season Rainfall	160mm

Table 1: Application.

Spray Volume	32 L/ha	48 L/ha	79 L/ha	82 L/ha Coarse
Application Method	Spray	Spray	Spray	Spray
Application Placement	Foliar	Foliar	Foliar	Foliar
Equipment Type	Hand Boom	Hand Boom	Hand Boom	Hand Boom
Ground Speed	12 kph	12 kph	12 kph	12 kph
Propellant Type	Compressed Air	Compressed Air	Compressed Air	Compressed Air
Diluent Carrier	Water	Water	Water	Water
Operating Pressure	200 kPa	200 kPa	300 kPa	200 kPa
Spray Swatch_Width	250cm	250cm	250cm	250cm
Nozzle Type	Hardi Orange LD-	Hardi Green LD-	Hardi Yellow LD-	Hardi Lilac LD-
Nozzle Size	110-01	110-015	110-02	110-025
Nozzle Spacing	50cm	50cm	50cm	50cm

Site Comments

The wild radish population was consistent and of high density (303/m²) across the site. Spray coverage was affected due to the high weed density and with 65% of the wild radish 4 leaf or larger across the site at application shading was also an influence.

This trial was applied immediately after rainfall so soil moisture was good but the weeds had just endured a fortnight of frosts with very dry conditions and were still highly stressed.

Coverage issues and the seasonal conditions prior to application, coupled with ongoing dry and stressed conditions following application, have contributed to lower than expected wild radish control from all treatments in this trial.



Figure 1: Site at application 13/7/10

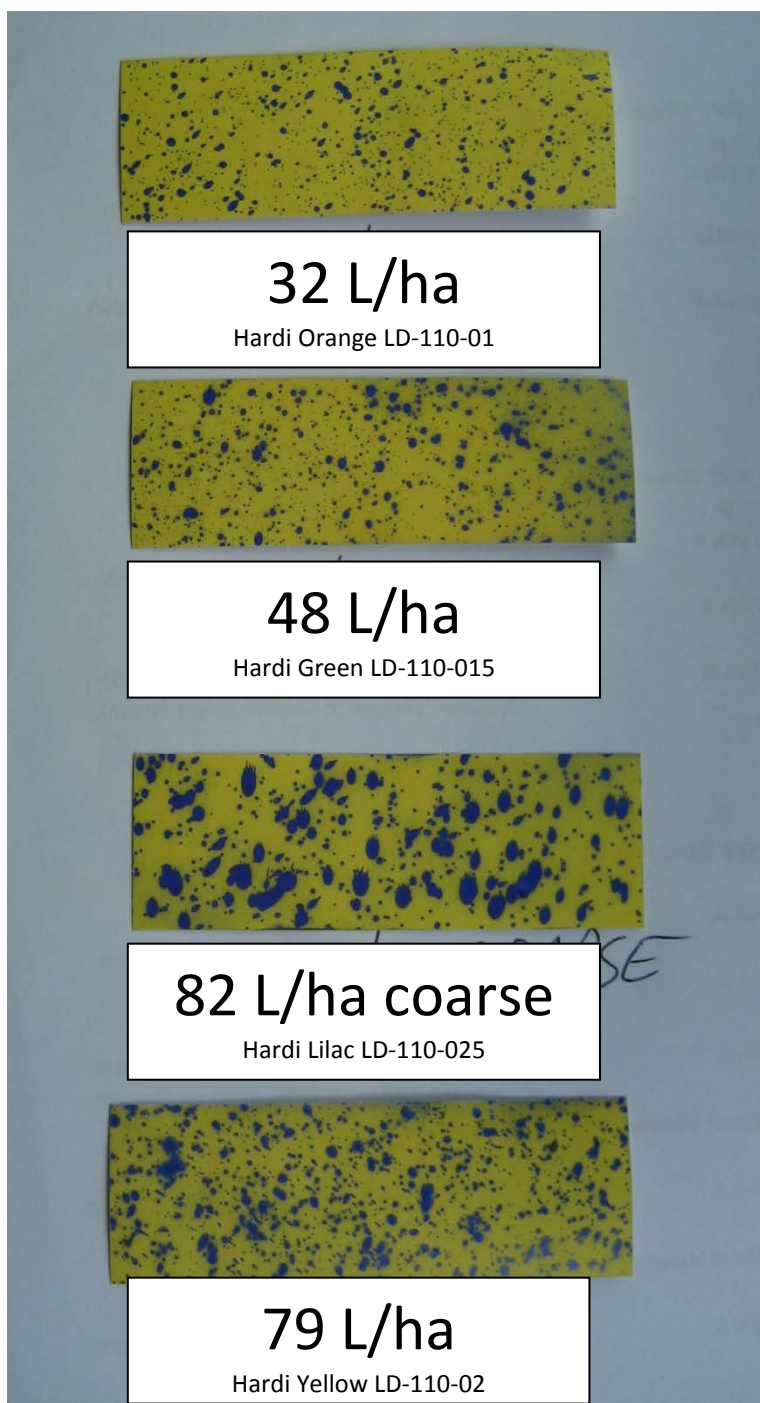


Figure 2: Spray quality by water volume – 13/7/10. (Water sensitive papers were placed on the horizontal weed leaf)

Coverage in the ranges produced by the Hardi Yellow LD-110-02 at 79 L/ha will help ensure optimal weed control provided weeds are not stressed.

To achieve the most effective control of wild radish aim for coverage comparable or better than that delivered by the 79 L/ha medium spray quality strip in this trial.

Results

Table 2: Crop safety and yield (t/ha) in Magenta wheat.

N o	Treatment	Assessment Date		22/7/10	22/7/10	3/8/10	3/8/10	26/8/10	15/11/10	15/11/10
		Days after application		9DAA	9DAA	21DAA	21DAA	44DAA	125 DAA	125 DAA
		Rating Type		Rating	Rating	Rating	Rating	Rating	Yield	Yield
		Rating Scale		0-100	0-100	0-100	0-100	0-100	Harvest	Harvest
		Rate/ ha	Water Rate L/ha	Discolour	Biomass Reduction	Discolour	Biomass Reduction	Crop Biomass	t/ha	% Untreated
1	UNTREATED			0	0	0	0	80	1.37 a	100
2	VELOCITY HASTEN	670 mL/ha 1 % v/v	32 L/ha	0	0	0	0	95	1.91 a	139
3	VELOCITY HASTEN	670 mL/ha 1 % v/v	48 L/ha	0	0	0	0	100	1.82 a	132
4	VELOCITY HASTEN	670 mL/ha 1 % v/v	79 L/ha	0	0	0	0	100	1.78 a	130
5	VELOCITY HASTEN	670 mL/ha 1 % v/v	82 L/ha coarse	0	0	0	0	100	1.73 a	126
6	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	32 L/ha	0	0	0	0	100	1.66 a	121
7	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	48 L/ha	0	0	0	0	105	1.77 a	129
8	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	79 L/ha	0	0	0	0	110	1.88 a	137
9	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	82 L/ha coarse	0	0	0	0	110	1.70 a	124
10	VELOCITY HASTEN	1 L/ha 1 % v/v	32 L/ha	0	0	0	0	100	1.67 a	121
11	VELOCITY HASTEN	1 L/ha 1 % v/v	48 L/ha	0	0	0	0	100	1.70 a	123
12	VELOCITY HASTEN	1 L/ha 1 % v/v	79 L/ha	0	0	0	0	105	1.75 a	128
13	VELOCITY HASTEN	1 L/ha 1 % v/v	82 L/ha coarse	0	0	0	0	100	1.80 a	131
14	JAGUAR	1 L/ha	32 L/ha	16	0	20	0	85	1.76 a	128
15	JAGUAR	1 L/ha	48 L/ha	16	0	20	0	95	1.71 a	125
16	JAGUAR	1 L/ha	79 L/ha	15	0	22	0	100	1.82 a	132
17	JAGUAR	1 L/ha	82 L/ha coarse	18	0	22	0	85	1.84 a	134

Yield t/ha means followed by the same letter do not significantly differ (P= 0.05, Duncan's New MRT).

Crop Effect

All Velocity® treatments were safe to the crop with no discolouration observed.

There was little effect of water rate on Jaguar®, with only the coarse droplets recording a slight increase in discolouration over the other treatments at 9 DAA. At 21 DAA there was no difference in discolouration between Jaguar® treatments and by 44 DAA no discolouration was observed in any treatment.

Crop Yield

All treatments out-yielded the untreated although none of the yield increases were statistically significant ($P \geq 5\%$). The application of Estericide® 680 of 1 L/ha on the 25th August was effective in controlling surviving weeds from the previous herbicide treatments. A 35mm rainfall event on the 31/8/10 revived the crop and with the follow up herbicide application being effective, some of the potential yield differences captured in earlier weed biomass ratings did not translate to end yield.

Velocity® 670 mL/ha did not record any influence on yield from differences in weed control recorded from the different water rates. Velocity® 670 mL/ha + MCPA did record a numerical increase (not significant $P \geq 5\%$) in yield from weed control at the different water rates.

There was a general trend for increased crop yield from Velocity® 1 L/ha and Jaguar® 1 L at water rates of 79 L at a medium or 82 L/ha coarse spray quality that matched weed control.

Table 3: Weed Control – *Raphanus raphanistrum* – Wild radish

		Assessment Date		22/7/10	3/8/10	26/8/10
		Days after application		9DAA	21DAA	44DAA
		Rating Type		Rating	Rating	Rating
		Rating Scale		0-100	0-100	0-100
No	Treatment	Rate/ ha	Water Rate	Control	Control	Control
1	UNTREATED			0	0	0
2	VELOCITY HASTEN	670 mL/ha 1 % v/v	32 L/ha	33	66	73
3	VELOCITY HASTEN	670 mL/ha 1 % v/v	48 L/ha	37	77	82
4	VELOCITY HASTEN	670 mL/ha 1 % v/v	79 L/ha	40	81	86
5	VELOCITY HASTEN	670 mL/ha 1 % v/v	82 L/ha coarse	38	77	76
6	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	32 L/ha	45	76	86
7	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	48 L/ha	50	88	94
8	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	79 L/ha	60	90	95
9	VELOCITY MCPA LVE HASTEN	670 mL/ha 500 mL/ha 1 % v/v	82 L/ha coarse	53	87	90
10	VELOCITY HASTEN	1 L/ha 1 % v/v	32 L/ha	37	70	78
11	VELOCITY HASTEN	1 L/ha 1 % v/v	48 L/ha	47	84	84
12	VELOCITY HASTEN	1 L/ha 1 % v/v	79 L/ha	50	84	91
13	VELOCITY HASTEN	1 L/ha 1 % v/v	82 L/ha coarse	60	84	82
14	JAGUAR	1 L/ha	32 L/ha	33	42	42
15	JAGUAR	1 L/ha	48 L/ha	37	48	43
16	JAGUAR	1 L/ha	79 L/ha	43	62	63
17	JAGUAR	1 L/ha	82 L/ha coarse	40	65	57

Note: The size and density of the wild radish in this trial combined with the stressed conditions should be taken into account when evaluating the levels of weed control in this trial.

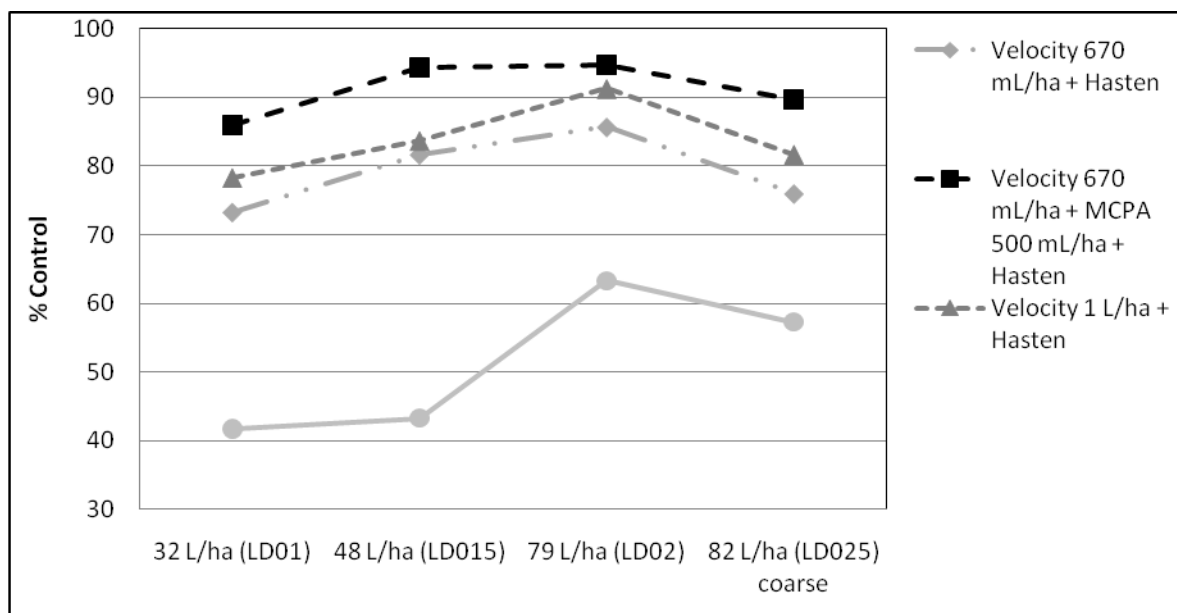


Figure 3: Wild radish control 26/8/10 (44 DAA).

Note: Scale starts at 30 % to highlight treatment differences and trends.

Effects of water rate on wild radish control

(All treatments were applied with a medium spray quality unless noted)

At 44 DAA with the density, size and levels of stress in the wild radish at this trial site Velocity® 670 mL/ha + Hasten® 1% v/v did not provide commercially acceptable control ($\geq 90\%$) at any of the water rates. There was an increase in the level of control from increasing water rates from 32 L/ha (73 rating) to 48 L/ha (82) to 79 L/ha (86). When the spray quality was altered to a coarse spray quality at the 82 L/ha water rate control was reduced (76).

The addition of MCPA LVE at 500 mL/ha to Velocity® 670 mL/ha resulted in an increase in weed control at all water rates. The inclusion of the translocated herbicide MCPA to a tank mixture with Velocity® also resulted in a reduction in the influence of water rate on weed control. The 32 L/ha water rate recorded a 10% increase over the same water rate of Velocity® 670 mL/ha alone. Both the 48 L/ha (94) and 79 L/ha (95) rates recorded an increase in control of wild radish that was commercially acceptable. Application with the 82 L/ha (90) coarse droplet recorded a reduction in control from the 79 L/ha medium spray quality.

Increasing the rate of Velocity® from 670 mL/ha to 1 L/ha resulted in an increase in wild radish control at all water rates. Despite the slight increase in wild radish control from the increased herbicide rate, the influence of water rate was identical to the trends recorded from 670 mL/ha of Velocity®.

Resistance to Group F herbicides is not a likely factor in the poor control recorded by Jaguar® 1 L/ha at all water rates. These results have been influenced by the highly stressed conditions and coverage issues. The impact of water rate followed a similar trend to Velocity® with an increase in control recorded between the 32 (42) to 79 L/ha (63) water rates. Application at 82 L/ha (57) in a coarse spray quality resulted in a decrease in control from the 79 L/ha medium spectrum.

Comments

When applying Velocity® using a medium spray quality the results from this trial support previous field experience that suggests water rates of around 80 L/ha provide optimal coverage and control of high density wild radish. The addition of the translocated herbicide MCPA LVE to Velocity® is recommended where weed size or coverage may be an issue or if lower water volumes around 50 L/ha are to be used. Application of Velocity® with a coarse spray quality (droplet spectrum) cannot be recommended based on the results of this trial at rates below 80 L/ha. Further work needs to be conducted to determine if higher water rates with coarse droplets will improve control.

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Paper reviewed by Greg Skinner – Technical advisory manager, Bayer CropScience.

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