

New weed control methods for leafy green brassicas

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Take home message

We evaluated the effect of Dual Magnum and Spartan applied preemergence after seeding, and Command applied to emerged weeds and mustard. All treatments caused some crop injury. Command caused the least amount of stunting and the only yields that were not lower than that of the untreated control; however, leaf chlorosis (whitening) was visible even at harvest. After two years of research we have not achieved consistent results that would support registration of any of these herbicides for use on mustard greens grown on non-muck soils. Further research is needed and should focus on lower rates of the herbicides tested as well as expanding the scope of possible herbicides.

Methods

An experiment was established at the OARDC, Wooster campus to test crop tolerance and weed control efficacy of potential herbicides on mustard greens. The experimental design was a randomized complete block with four replications. Mustard green variety 'Green Wave' was used. Herbicides tested in the experiment included: Command POST, Dual Magnum PRE and Spartan PRE. PRE refers to pre-emergence sprays applied after seeding but before crop emergence and POST refers to post-emergence sprays applied after the crop has emerged.

Results

Spartan at 6 and 3 fl oz/A PRE caused crop injury and reduced yields compared to the Untreated control (Table 1). The high rate of Spartan caused a measured reduction in crop stand. This result was in contrast to 2018 when Spartan was safer to the crop. Command POST and Dual Magnum PRE were less injurious than Spartan and had overall good crop stands but yield was reduced with Dual Magnum and the combination of Dual Magnum PRE followed by Command POST.

Table 1. Response of mustard greens to Command, Dual Magnum and Spartan

No.	Treatment	Rate	Timing	Injury %								Stand count	Total fresh weight							
				6/3/2019		6/12/2019		6/18/2019		6/24/2019		6/26/2019	6/26/2019							
						chlorosis	stunting	chlorosis	stunting	chlorosis	stunting	#	kg							
1	Untreated	-	-	0	c	0	c	0	c	0	b	0	d	0	b	237	a	3.415	a	
2	Command	0.315	l/a	B	.	.	17.5	b	5	b	6.3	c	1.3	b	208.5	ab	2.979	abc		
3	Command	0.473	l/a	B	.	.	18.8	b	1.3	b	17.5	a	0	b	172.5	ab	2.7675	bc		
4	Command	0.63	l/a	B	.	.	26.3	a	5	b	20	a	0	b	231	a	3.0615	ab		
5	Dual Magnum	1.33	pt/a	A	45	b	87.5	a	0	c	75	a	0	d	38.8	a	109.3	bc	1.2765	d
6	Dual Magnum	0.66	pt/a	A	22.5	bc	50	b	0	c	17.5	b	0	d	5	b	159	abc	2.384	c
7	Spartan 4F	3	fl oz/a	A	35	b	62.5	b	0	c	20	b	0	d	7.5	b	144.3	abc	2.39	c
8	Spartan 4F	6	fl oz/a	A	80	a	85	a	0	c	65	a	0	d	32.5	a	57.3	c	1.1585	d
9	Dual Magnum	0.66	pt/a	A	22.5	bc	60	b	26.3	a	16.3	b	13.8	b	6.3	b	161	abc	2.4265	c
	Command	0.315	l/a	B																

Note: Mustard was seeded on 5/24/19. No other maintenance activities were performed. Harvest took place on 6/26/2019, all plants from the middle 5 ft of each plot were harvested and weighed.

Crop chlorosis (whitening of foliage) was observed in all plots treated with Command. Injury symptoms caused by Dual Magnum and Spartan were most notable 2 weeks after the PRE applications but the crop

recovered over time. Differing results with Spartan from the 2018 and 2019 trials could have been due to weather conditions, 2018 had higher temperatures and dryer conditions and 2019 had cooler temperatures and heavy rains. Also, the experiment was conducted in a different field and soil type may have been a factor in the crop injury experienced with Spartan in 2019.

All herbicides provided good weed control after the pre-emergence application (Table 2). PRE treatments continued to provide good weed control for 4 weeks. POST applications with different rates of Command provided relatively good weed control, but did not control grasses and purslane, perhaps because the weeds had emerged by the time of application.

Table 1. Weed response to different herbicides in mustard greens

No.	Treatment	Rate	Timing	Weed control %			
				6/3/2019	6/12/2019	6/18/2019	6/24/2019
1	Untreated	-	-	0 c	0 b	0 d	0 c
2	Command	0.315 l/a	B	.	.	76.3 bc	81.3 b
3	Command	0.473 l/a	B	.	.	70 c	73.8 b
4	Command	0.63 l/a	B	.	.	82.5 b	92.5 a
5	Dual Magnum	1.33 pt/a	A	95 ab	100 a	98.8 a	100 a
6	Dual Magnum	0.66 pt/a	A	95 ab	90 a	92.5 a	93.8 a
7	Spartan 4F	3 fl oz/a	A	90 b	90 a	95 a	92.5 a
8	Spartan 4F	6 fl oz/a	A	100 ab	97.5 a	100 a	98.8 a
9	Dual Magnum	0.66 pt/a	A	92.5 ab	90 a	92.5 a	97.5 a
	Command	0.315 l/a	B				

Note: Mustard was seeded on 5/24/19. No other maintenance activities were performed. Harvest took place on 6/26/2019, all plants from the middle 5 ft of each plot were harvested and weighed.

Considering both weed control and crop safety, Dual Magnum at 0.66 pt/A (Trt 6) and Spartan at 3 fl oz/A (Trt 7) showed the most promising results, with no visible injury to the crop at harvest making them potential herbicides for weed control in mustard green production. Crop safety with Trt 6 and Trt 7 are comparable to Trt 9 (Dual Magnum 0.66 pt/A + Command 0.315 l/A), although chlorosis was still visible with Trt 9 at harvest (Table 2).

Figure 1. Weed control in mustard greens sprayed with Spartan at 3 fl oz/A and Dual Magnum at 0.66 pt/A compared to Untreated plots 2 weeks after treatment.



Figure 2. Chlorosis symptoms showed at harvest after Command applications compared to untreated plot.

