

WEED CONTROL IN PEPPERMINT AND SPEARMINT

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Introduction

Peppermint and spearmint crops have been removed from the Prowl (pendimethalin) label. Mint growers are left without a soil active herbicide with residual activity to control many species of summer annual broadleaf and grassy weeds. The purpose of these studies are to evaluate experimental herbicides in small replicated plots and to compare registered herbicides for weed control and crop tolerance in field strip plots. Observations were taken on herbicide performance from different rates, tank-mixes, and timing of applications. Our objective is to find herbicide treatments that will control summer weeds with the same effectiveness as Prowl.

Procedures

Herbicides evaluated in the replicated trial included Command EC and two slow release formulations of Command identified as PL 95-087 and PL 95-014. Each formulation was applied at 0.5 and 1.0 lb ai/ac. The experimental FMC herbicide F 6825 was included at rates of 0.187, 0.25, and 0.5 lb ai/ac. Prism was tank-mixed with all treatments for grass control at the rate of 0.094 lb ai/ac. These herbicide treatments were applied to 3-year old spearmint. The field was located near Nyssa, Oregon. The field was rotary corrugated in the fall for furrow irrigation. Buds of mint were starting to emerge when herbicides were applied. Soil surface was in excellent tilth. Soils were silt loam texture with 1.1 percent organic matter and a pH of 7.3. Herbicides were applied on March 7. Air temperature was 50°F, soil temperature at 4-inches 36°F, skies were clear, and the wind was calm. Spray equipment was a single bicycle wheel plot sprayer, 8.5 foot boom, and 10-inch spacing between 8002 teejet fan nozzles. Spray pressure was 42 psi using a water volume of 34 gal/ac. Spray pattern was broadcast double overlap. Weed species present when herbicides were applied included downy brome, prickly lettuce, blue mustard, tansy mustard, and tumbling mustard. Downy brome was tillering, prickly lettuce had 4 leaves with 2 inch wide rosettes, and the mustard species were 2 inches tall and 2 to 3 inches across rosettes.

The strip plots were applied to peppermint and spearmint in fields located near Nyssa, Oregon, New Plymouth, Idaho, and Nampa, Idaho. All these sites were on two and three year old mint. Herbicides included Command, Sinbar, Stinger, Karmex, Buctril, and Gramoxone. Fusilade and Assure II were applied at certain sites to evaluate for control of downy brome. Treatments were two and three way tank-mixes applied at varying rates. Herbicide treatments were applied using a Rear's manufactured pull type sprayer equipped with a fifteen foot spray boom and teejet fan nozzles size 8002

spaced ten inches apart spraying herbicides in a broadcast double overlap pattern. Spray pressure was 35 psi and water volume 28 gal/ac. The sprayer was pulled with a 4-wheel recreational vehicle. Each treatment consisted of plots 30-feet wide for the length of the field. Herbicides, rates, and results are included in separate tables for individual sites, because the time of application and weed species varied between locations.

Results

The emulsifiable formulation of Command herbicide was slightly more active than the encapsulated formulations of Command. Weed control was better from the emulsifiable concentrate formulation at the 0.5 lb ai/ac. Symptoms of chlorosis from Command on crop and weedy plants in plots adjacent to Command treated plots were about equal between the two formulations indicating drift from Command vapors can still occur from the encapsulated PL 95-087 and PL 95-014 formulations. Mint and weedy plants in plots adjacent to the encapsulated treated plots may have outgrown the symptoms sooner, but the initial symptoms were as pronounced as those on plants adjacent to plots treated with the emulsifiable concentrate formulation. Weed control was excellent for both formulations at the one pound ai/ac rate. Command controlled all mustard species of weeds and persisted in the soil to give preemergence control of pigweed, lambsquarters, kochia, barnyardgrass, and green foxtail. It was less active on prickly lettuce giving only partial control of that species. The FMC herbicide F 6825 did not perform well in this trial. At the lower rates it did not control the annual weeds effectively, and spearmint was injured at the higher rate. F 6825 did show good activity for control of yellow nutsedge. Prism was compatible with Command and controlled downy brome. Prism did not control downy brome when tank-mixed with F 6825.

The outstanding treatment applied on grower fields in strip applications was the tank-mix combination of Karmex, Sinbar, and Gramoxone (0.8, 1.0, and 0.33 lb ai/ac respectively). A crop oil concentrate (MorAct) was added to the preceding tank-mix at the rate of 1 quart per acre. Both spearmint and peppermint were tolerant to the tank-mix treatments. No herbicide injury was observed in the crop, and weed control was excellent. Gramoxone with Sinbar and Karmex gave excellent control of all emerged weed species including downy brome and persisted to control spring and summer germinating annual weeds and even weeds germinating postharvest. Stinger was very active on prickly lettuce and gave excellent control when used in combination with Karmex and Command. Command was compatible with Karmex, Stinger, and Sinbar tank-mixes. Command vapor drifted to adjacent fields for a distance of 300 feet or more causing severe chlorosis to wheat, but the wheat recovered with normal color and growth. Fusilade tank-mixed with other herbicides did not give complete control of downy brome. Downy brome was severely injured initially, but some plants recovered and continued to grow. This did not occur with Gramoxone tank-mixes. Bucril tank-mixed with Karmex was also effective on emerged species of mustards and prickly lettuce. Karmex plus Sinbar did not control all prickly lettuce. Stinger added with Karmex and Sinbar gave excellent control of prickly lettuce from both contact and

preemergence activity. Results from these studies show that Karmex tank-mixed with Sinbar and Gramoxone or other herbicides including Command and Stinger in tank-mix combinations can effectively control both winter and summer annual weeds. If Prowl is relabeled, Prowl/Karmex combinations with Gramoxone, Sinbar, or Stinger may be very effective and useful combinations in both established and new plantings of spearmint and peppermint.

Table 1. Crop tolerance and weed control ratings from spring applied herbicides to established stands of spearmint. Froerer Farms, Nyssa, Oregon, 1995.

		Percent weed control																	
		Crop injury			P. lettuce			Downy brome			Yellow nutsedge			Tumbling mustard			Blue mustard		
Herbicides	Rate	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	lb a/ac	— % —			%														
Command + Prism	0.5 + 0.094	0	0	0	85	90	90	100	100	100	40	45	40	98	100	100	98	100	100
Command + Prism	1.0 + 0.094	0	0	0	93	95	95	100	100	100	75	85	70	100	100	100	100	100	100
PL 95-087 + Prism	0.5 + 0.094	0	0	0	80	85	80	75	75	70	25	25	30	98	95	95	98	98	98
PL 95-087 + Prism	1.0 + 0.094	0	0	0	85	85	85	100	100	100	65	65	65	100	100	100	100	100	100
PL 95-014 + Prism	0.5 + 0.094	0	0	0	90	95	95	75	70	75	30	40	40	100	98	98	98	100	100
PL 95-014 + Prism	1.0 + 0.094	0	0	0	95	93	95	100	95	100	65	65	65	100	100	100	100	100	100
F 6825 + Prism	0.187 + 0.094	30	35	35	85	90	90	25	35	30	45	50	50	85	80	85	80	85	85
F 6825 + Prism	0.25 + 0.094	40	35	40	85	90	95	20	25	30	90	85	85	90	80	80	85	80	85
F 6825 + Prism	0.5 + 0.094	50	45	45	100	100	100	25	25	20	95	90	90	100	100	100	100	100	100
Untreated check	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Herbicides applied on March 7. Evaluated on June 2. MorAct crop oil concentrate added to all treatments at rate of 1 qt/ac.

Ratings: 0 = no control. 100 = all plants killed.

All weeds emerged except yellow nutsedge when herbicides applied. Dense stands of yellow nutsedge emerged in May.

Table 2. Crop tolerance and weed control ratings from herbicides applied in November to established spearmint. George Mc Celland, New Plymouth, Idaho, 1995.

		Percent weed control																				
		Crop injury			P. lettuce			Blue mustard			Pigweed			Lambequarters			Kochia			Green foxtail		
Herbicides	Rate	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	lb a/ac	— % —			%																	
Command + Stinger	1.0 + 0.125	0	0	0	100	100	100	100	100	100	98	98	98	95	98	95	98	98	98	99	95	95
Karmax + Sinbar	0.8 + 1.0	0	0	0	85	90	80	100	100	100	95	98	95	100	99	100	95	95	95	98	95	98
Karmax + Stinger	0.8 + 0.125	0	0	0	100	100	100	100	100	100	90	90	85	95	90	90	90	93	85	90	95	90
Karmax + Stinger + Sinbar	0.8 + 0.125 + 0.5	0	0	0	100	100	100	100	100	100	95	98	98	100	100	100	98	95	95	99	100	99
Untreated check	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Herbicides applied November 7, 1994. Evaluated May 27, 1995.

Rating: 0 = no control. 100 = all plants killed.

Prickly lettuce and blue mustard emerged when treatments applied. Pigweed, lambequarters, kochia, and green foxtail controlled by preemergence herbicide

Table 3. Crop injury and weed control ratings from herbicides applied in March to established spearmint. Froerer Farms, Nyssa, Oregon, 1995.

Herbicides	Rate	Crop injury	Percent weed control																	
			P. lettuce			Pigweed			Kochia			Blue mustard			Downy brome			Barnyardgrass		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	lb ai/ac	— % —	%																	
Karmex + Gramoxone	0.8 + 0.33	0 0 0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Karmex + Sinbar + Gramoxone	0.8 + 1.0 + 0.33	0 0 0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Karmex + Stinger + Fusilade	0.8 + 0.125 + 0.1875	0 0 0	100	100	100	100	100	100	100	100	100	100	100	100	85	80	80	100	100	100
Karmex + Buctril + Fusilade	0.8 + 0.5 + 0.1875	0 0 0	100	100	100	100	100	100	100	100	100	100	100	100	80	80	80	100	100	100
Karmex + Command	0.8 + 0.5	5 10 5	98	98	98	100	100	100	100	100	100	100	100	100	70	75	70	100	100	100
Karmex + Command + Fusilade	0.8 + 0.5 + 0.1875	10 10 5	98	98	98	100	100	100	100	100	100	100	100	100	80	85	80	100	100	100
Untreated check	—	0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Herbicides applied March 2. Evaluated June 14. MorAct crop oil concentrate added to all treatments at rate of 1 qt/ac.

Ratings: 0 = no control. 100 = all plants killed.

Prickly lettuce, blue mustard, and downy brome emerged when herbicides applied. Pigweed, kochia, and barnyardgrass control from preemergence herbicide activity.

Soil texture sandy loam, 1.0 % organic matter, pH 7.1.

Table 4. Crop injury and weed control ratings from herbicides applied in November and March to established peppermint. Robert McKellep, Meridian, Idaho, 1995.

Herbicides	Rate	Applied	Crop injury	Percent weed control																			
				P. lettuce			Pigweed			Kochia			Mustard sp.			Downy Brome			Barnyardgrass				
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
	lb ai/ac		— % —	%																			
Karmex + Stinger + Sinbar	0.8 + 0.125 + 1.0	11-9	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	80	80	85	100	100	100
Karmex + Stinger	0.8 + 0.125	11-9	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	60	50	60	100	100	100
Command + Stinger	1.0 + 0.125	11-9	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	85	85	85	100	100	100
Karmex + Command + Stinger	0.8 + 0.05 + 0.125	3-8	5	10	5	100	100	100	100	100	100	100	100	100	100	100	100	85	85	85	100	100	100
Karmex + Sinbar + Gramoxone	0.8 + 1.0 + 0.33	3-8	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Karmex + Command	0.5 + 1.0	3-8	5	5	10	100	100	100	100	100	100	100	100	100	100	100	100	80	85	85	100	100	100
Untreated check	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Herbicide applied November 9, 1994 or March 9, 1995. Evaluated May 11. MorAct crop oil concentrate added to all treatments at rate of 1 qt/ac.

Ratings: 0 = no control. 100 = all plants killed.

Prickly lettuce and mustard species (blue mustard, tumbling mustard, and shepherd's purse) emerged when herbicides applied. Pigweed, kochia, downy brome, and barnyardgrass controlled by preemergence activity.

Soil texture clay loam, 1.2% organic matter and pH 6.9. Furrow irrigated.

Table 5. Crop injury and weed control ratings from herbicides applied in March to established spearmint. Robert McKellep, Nampa Idaho, 1995.

Herbicides	Rate lb a/ac	Crop injury			Percent weed control																
		1	2	3	Pigweed			Kochia			Lambsquarters			Barnyardgrass			Green foxtail				
		—	—	—	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
Command + Karmex + Stinger	0.5 + 0.8 + 0.125	0	0	0	100	100	100	100	100	100	100	100	100	100	100	98	95	98	100	100	100
Sinbar + Command	1.0 + 0.5	0	0	0	100	100	100	100	100	100	100	100	100	100	100	99	100	99	100	100	100
Sinbar + Command	1.0 + 1.0	10	10	5	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Command	1.0	5	10	5	100	100	100	100	100	100	100	100	100	100	100	90	85	90	100	100	100
Command	2.0	20	25	20	100	100	100	100	100	100	100	100	100	100	100	100	99	99	100	100	100
Untreated check	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Herbicide applied November 9, 1994 or March 9, 1995. Evaluated May 11. MorAct crop oil concentrate added to all treatments at rate of 1 qt/ac.

Ratings: 0 = no control. 100 = all plants killed.

Prickly lettuce and mustard species (blue mustard, tumbling mustard, and shepard's purse) emerged when herbicides applied. Pigweed, kochia, downy brome and barnyardgrass controlled by preemergence activity.