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Summer Annual Weed Control in Peppermint

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In 2009, two herbicide trials were conducted in Tulelake CA to evaluate the efficacy and crop safety of pre- and post-emergent herbicides for controlling summer annual weeds in established and baby mint.

Methods: Herbicide treatments were applied in randomized complete block with three replications. Plot size was 10 by 30 ft. Herbicides were applied at 20 gallons/acre using a CO_2 pressurized backpack sprayer. Herbicide treatments are listed in the Table 1 and 2. In baby mint, pre-emergent treatments were applied on May 9, 2009. The baby mint was planted fall 2008. Mint plants were 0.5 to 1.0 inch tall, and summer annual weeds were 0 to 1 inch tall at the time of herbicide application. Post-emergent treatments were applied on June 14, 2009. Mint was 5 to 7 inches tall, and summer annual weeds were 1 to 4 inches tall. Mint was not harvested in the seedling trial due to an irregular mint stand.

In established mint, pre-emergent treatments were applied on May 9, 2009. Post-emergent treatments were applied on May 29, 2009. Mint was 0 to 1 inch tall on the May 9th application, and 3 to 6 inches tall on the May 29th application. Weed control ratings were not possible in the established trial due to a sporadic weed population. Mint was harvested on August 17, 2009 at 30 to 60% bloom in the untreated plot. All plots were distilled for oil yield and quality.

Results: In the established trial, several treatments caused visual injury 1 and 2 months after application (Table 1). Prowl H_20 (pre-emergent treatment) at all rates caused significant stunting 1 and 2 months after treatment. Thistrol and Shark (post-emergent treatments) caused more than 20% injury one month after treatment. Nortron and Spartan (pre-emergent treatments) caused minimal injury in established mint. Basagran + Stinger and Basagran + Starane applied post-emergent did not injure the mint.

Stunting from Prowl H_20 and Shark carried over into first cutting. Plants in these plots were shorter and had less bloom compared to other treatments (Table 1). Oil yield for all treatments was not different from the untreated control, but stunting did influence oil quality. Menthofuran was significantly lower in Prowl H_20 and Shark treatments compared to the untreated plot (Table 1). Menthofuran was significantly higher in the Basagran + Stinger and Basagran + Shark treatments compared to untreated plots.

In the baby mint trial, the low rate of Prowl H20, Nortron, and Spartan were safe pre-emergent treatments in baby mint (Table 2). The high-rate of Prowl and Prowl tank-mixed with Nortron caused stunting during the June and July evaluations. Basagran + Stinger and Basagran + Starane were safe post-emergent treatments in baby mint. Thistrol and Shark caused greater than 20% injury to baby mint.

The predominant weeds in the baby mint trial were redroot pigweed and hairy nightshade. Spartan, Basagran + Stinger, and Basagran + Starane provided greater than 85% control of both weed species and displayed adequate crop safety.

Table 1: The Influence of Herbicides on Crop Injury, Oil Yield, Growth Stage at Harvest, and Menthofuran in Established Peppermint.

trt #	Herbicide	Product Rate	Treatment Timing	Appl. Date	Mint % Injury◊ 5/29/2009	Mint % Injury◊ 6/8/2009	Mint % Injury◊ 7/2/2009	Mint Oil Yield (lb/A) 8/18/2009	Mint Growth Stage* 8/18/2009	Mentho furan
1	Prowl H20	2 pt/A	Spring emergence	5/9/2009	10% b	25% d	14% b	78a	5ab	1.8ab
2	Prowl H20	4 pt/A	Spring emergence	5/9/2009	20% c	40% f	28% c	85a	4a	1.5a
3	Prowl H20	2 pt/A	Spring emergence	5/9/2009	23% c	32% e	25% c	79a	4a	1.5a
3	Nortron	2 pt/A	Spring emergence							
3	NIS		Spring emergence							
4	Nortron	2 pt/A	Spring emergence	5/9/2009	0% a	3% ab	0% a	84a	5.5bc	2.1bc
5	Thistrol	2 pt/A	Late- May	5/29/2009	**	8% bc	23% c	80a	5.5bc	2bc
5	NIS		Late- May							
6	Thistrol	2 pt/A	Late- May	5/29/2009	**	8% bc	25% c	77a	5.5bc	2.1bc
6	Basagran	1.5 pt/A	Late- May							
6	MSO		Late- May							
7	Basagran	3 pt/A	Late- May	5/29/2009	**	0% a	2% a	82a	5.5bc	2.5d
7	Stinger	6 oz/A	Late- May							
7	MSO		Late- May							
8	Starane	6 oz/A	Late- May	5/29/2009	**	7% bc	12% b	80a	5.5bc	2.3cd
8	Basagran	3 pt/A	Late- May							
8	MSO		Late- May							
9	Spartan	8 oz/A	Spring emergence	5/9/2009	8% b	3% ab	3% a	75a	6.0c	2.3cd
10	Shark EW	0.77 oz/A	Late- May	5/29/2009	**	23% d	40% d	81a	4a	1.6a
10	NIS		Late- May							
11	Shark EW	0.77 oz/A	Late- May	5/29/2009	**	20% d	25% c	81a	5bc	2.6d
	Basagran	3 pt/A	Late- May							
	MSO		Late- May							
12	Untreated				0% a	0% a	0% a	81a	6c	2.1bc

Means within each column followed by the same letter are not statistically different at P=0.05

Herbicides were applied at 20 GPA.

Mint was 0 to 1 inch tall during spring emergence treatment; Mint was 3 to 6 inches tall at late-May treatment

Mint was harvested when the control plots reached 30% to 60% bloom on August 17th, 2009

◊ 0% = no injury and 100% = crop death; spring emergence treatments stunted plant growth; post-emergent trts in late-May caused chlorosis & stunting

* Mint growth/development stage at harvest: 4 = Multiple elongated buds 1% - 5% bloom; 5 = 1% - 15% bloom; 5.5 = 16% - 30% bloom; 6 = 30% - 60% bloom

Table 2: The Influence of Herbicides on Weed Control and Crop Injury in Baby Peppermint.

trt #	Herbicide	Product Rate	Treatment Timing	Appl. Date	Mint % Injury 26-Jun	Mint % Injury 21-Jul	Pigweed % Control 26-Jun	Nightshade % Control 26-Jun
1	Prowl H20	2 pt/A	Spring emergence	9-May	15	5	50	60
2	Prowl H20	4 pt/A	Spring emergence	9-May	45	20	75	95
3	Prowl H20	2 pt/A	Spring emergence	9-May	47.5	22.5	85	87.5
3	Nortron	2 pt/A	Spring emergence					
3	NIS		Spring emergence					
4	Nortron	2 pt/A	Spring emergence	9-May	10	6.25	85	0
5	Thistrol	2 pt/A	Late- May	14-Jun	25	20	50	62.5
5	NIS		Late- May					
6	Thistrol	2 pt/A	Late- May	14-Jun	24	22.5	80	95
6	Basagran	1.5 pt/A	Late- May					
6	MSO		Late- May					
7	Basagran	3 pt/A	Late- May	14-Jun	8.5	10	87.5	100
7	Stinger	6 oz/A	Late- May					
7	MSO		Late- May					
8	Starane	6 oz/A	Late- May	14-Jun	10	7.5	95	100
8	Basagran	3 pt/A	Late- May					
8	MSO		Late- May					
9	Spartan	8 oz/A	Spring emergence	9-May	15	5	95	97.5
10	Shark EW	0.77 oz/A	Late- May	14-Jun	42.5	30	95	100
10	NIS		Late- May					
11	Untreated				0	0	0	0
				LSD (P=.05)	16.27	11.31	26.32	19.77

Herbicides were applied at 20 GPA.

Mint was 0 to 1 inch tall during spring emergence treatment; Mint was 3 to 6 inches tall at June treatment

Weeds were 1 inch tall during spring emergence and 4 inches tall during post treatment

◊ 0% = no injury and 100% = crop death