

2017 Field Day - Weed Research in Mint

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Five weed management trials are being conducted in 2017. One trial is located off station on a commercial production field, three field trials on WSU-Roza station, and a container trial at the WSU-Prosser station. Two field trials are collecting data on the efficacy of pyridate compared to other labeled postemergence broadleaf herbicides and are also being conducted in California, Oregon, Indiana, and Wisconsin on pertinent broadleaf species in each state.

- 1. Multi-state pyridate trial in Scotch spearmint.** Wyckoff farms circle 311, Paterson. Comparing kochia control with pyridate to other labeled POST broadleaf herbicides in Scotch spearmint. Will take to oil and hay yield.
- 2. Multi-state pyridate trial in peppermint.** WSU-Roza, Prosser. Comparing redroot pigweed control with pyridate to other labeled POST broadleaf herbicides in second growth after first harvest. Will take to oil and hay yield.
- 3. Saflufenacil and linuron dormant treatments.** WSU-Roza native spearmint. Herbicide treatments were applied in early March. Evaluating weed control and crop injury with saflufenacil, linuron, and several combination treatments with other labeled preemergence herbicides. Will take to oil and hay yield.
- 4. Saflufenacil after first cutting.** WSU-Roza, peppermint. Testing saflufenacil applied after first harvest and before new mint regrowth. Crop safety study. Will take to oil and hay yield.
- 5. Potentilla (cinquefoil) control.** Conducting a postemergence herbicide study on *Potentilla supina* grown in outdoor containers. Testing saflufenacil, paraquat, MCPB, carfentrazone, and pyridate and a few combinations. Trial will be repeated at least once.

Multi-state pyridate trial in Scotch spearmint.

Belchim chemical company is working toward registering pyridate (Tough) herbicide in mint in the near future. Kochia control with pyridate (Tough) is being compared to other postemergence (POST) herbicides labeled in mint. Six treatments are being tested in Scotch spearmint at Wyckoff Farms near Paterson, WA. The soil is a sandy loam and similar studies on other broadleaf species are being conducted in WA, OR, CA, IN, and WI and funded by the MIRC. The entire trial was treated with pendimethalin 1 lb ai/a, terbacil, 0.5 lb ai/a, clopyralid 0.125 lb ai/a, and paraquat 0.75 lb ai/a on Feb. 28, 2017 when mint was dormant to control winter annual weeds that were present and to control weeds other than kochia preemergence.

POST herbicides were applied May 2, 2017 with a bicycle sprayer calibrated to deliver 25 GPA and treatments were replicated four times in a RCB design. Scotch spearmint was 2 to 4 inches tall and kochia was 0.5 to 3 inches tall when POST herbicides were applied. Individual plots were 10 by 25 feet.

Table 1. Kochia control and Scotch spearmint injury following six postemergence applied herbicide treatments applied May 2, 2017 near Paterson, WA.

Treatment	Rate Lb ai/a	5-22-17 Kochia Control (%)	5-22-17 Mint Injury (%)
1 Nontreated	--	0 c	0 c
2 Pyridate (Tough) + COC	0.94	100 a	0 c
3 Bentazon (Basagran) + COC	1	99 a	0 c
4 Terbacil (Sinbar) + COC	0.5	66 b	0 c
5 Bromoxynil (Buctril) + NIS	0.375	100 a	9 b
6 MCPB (Thistrol) + NIS	0.5	68 b	12 ab
7 Clopyralid (Stinger)	0.19	0 c	15 a

Initial Results.

On May 11, 2017, 9 days after the POST applications (DAT), kochia was controlled 95 to 99% with treatments of pyridate, bentazon, and bromoxynil and by May 22, 2017 kochia control was 99 to 100% with the three herbicides (Table 1). Terbacil and MCPB only controlled kochia 66% and 68%, respectively at on May 22. Clopyralid did not control kochia. Many small redroot pigweed were starting to emerge at 9 DAT and it appeared fewer were emerging in pyridate and bromoxynil treated plots.

No significant spearmint injury was observed with terbacil, bentazon, and pyridate (Table 1). Bromoxynil caused some chlorosis of the spearmint, clopyralid caused some leaf cupping, and MCPB stunted the mint growth at 9 DAT. Additional weed control ratings and Scotch spearmint hay and oil yield will be determined.

Saflufenacil and linuron dormant treatments.

Twelve herbicide treatments were applied PRE to native spearmint March 7, 2017. Either paraquat (Gramoxone) or saflufenacil (Sharpen) were included with most treatments to control winter annual weeds that were present. Linuron (Lorox), terbacil (Sinbar), pendimethalin (Prowl H2O), pyroxasulfone (Zidua), flumioxazin (Chateau), sulfentrazone (Spartan), clomazone (Command) were included in various tank mixes (Table 2). Herbicides were applied with a bicycle sprayer calibrated to deliver 25 GPA through six, 8002 XR flat fan spray tips. Individual plots were 10 by 25 feet and treatments were replicated four times in a RCB design. A nontreated check was included as a comparison. Native spearmint injury and weed control were rated March 17, March 28, April 7, April 21, and May 19, 2017.

Initial Results.

Native spearmint injury following herbicides applied March 7, 2017 was greatest with Command plus Lorox, averaging 18% injury with symptoms of leaf bleaching (chlorosis). All other herbicide treatments resulted in less than 3% injury (Table 2). Injury from the Command plus Lorox tank mix was only 4% by April 21, 2017 and was absent in May.

The main early season weed was common chickweed. All treatments containing Gramoxone controlled chickweed well (>93%) (Table 3). Treatments containing Sharpen (without Gramoxone) did not control common chickweed well in March and early April. However, the tankmix of Sharpen with Sinbar eventually controlled common chickweed in May, whereas tank mixes of Sharpen with Prowl or Zidua did not (Table 3).

There were lesser amounts of Shepherd's purse and downy brome present and the number of plants per plot was recorded on May 19, 2017. Among Sharpen and Sharpen tank mix treatments, only the tank mix with Sinbar totally controlled shepherd's purse and downy brome (Table 3). Three-way tank mixes of Gramoxone with Lorox combined with Chateau, Sinbar, or Command all eliminated downy brome. Three-way tank mixes of Gramoxone with Lorox combined with Sinbar, Command, or Spartan eliminated shepherd's purse (Table 3).

Table 2. Native spearmint injury following twelve PRE herbicide treatments applied March 7, 2017 at WSU-Roza station near Prosser, WA.

Treatment	Rate (lbs ai/a)	Native Spearmint Injury		
		April 7	April 21	May 19
		-----%-----		
1. Nontreated		0 c	0 c	0
2. Sharpen	0.044	0 c	0 c	0
3. Sharpen	0.088	0 c	0 c	0
4. Sharpen + Sinbar	0.044 + 0.5	1 bc	0 c	0
5. Sharpen + Prowl H ₂ O	0.044 + 1.5	0 c	0 c	0
6. Sharpen + Zidua	0.044 + 0.19	0 c	0 c	0
7. Lorox + Chateau + Gramoxone	1 + 0.125 + 0.5	1 bc	0 c	0
8. Lorox + Gramoxone	1 + 0.5	0.5 c	0 c	0
9. Lorox + Sinbar + Gramoxone	1 + 0.5 + 0.5	0.5 c	0 c	0
10. Lorox + Command + Gramoxone	1 + 0.35 + 0.5	18 a	4 a	0
11. Lorox + Spartan + Gramoxone	1 + 0.19 + 0.5	0 c	0 c	0
12. Lorox + Chateau + Gramoxone	1 + 0.125 + 0.5	0 c	0 c	0
13. Lorox + Zidua + Gramoxone	1 + 0.19 + 0.5	3 b	1 b	0

Numbers within a column followed by the same letter are not significantly different according to LSD test at P=0.05.

Treatments 2-6 included MSO at 1% and AMS at 2% (v/v) spray solution.

Treatments 7-13 included COC at 1% (v/v) spray solution.

Table 3. Weed control following PRE and POST herbicide treatments applied Feb. 24, 2016 and April 14, 2016 to peppermint planted the previous fall at Paterson, WA.

Treatment	Rate (lbs ai/a)	Common Chickweed May 19 % Control	Shepherd's Purse May 19 No./plot	Downy Brome May 19 No./plot
1. Nontreated		0 d	1.8	0.5
2. Sharpen	0.044	0 d	2.5	1.3
3. Sharpen	0.088	15 c	1.3	1.3
4. Sharpen + Sinbar	0.044 + 0.5	100 a	0	0
5. Sharpen + Prowl H ₂ O	0.044 + 1.5	18 c	0.5	0.8
6. Sharpen + Zidua	0.044 + 0.19	45 b	1.3	1.5
7. Lorox + Chateau + Gramoxone	1 + 0.125 + 0.5	100 a	0.3	0
8. Lorox + Gramoxone	1 + 0.5	100 a	1.0	0.8
9. Lorox + Sinbar + Gramoxone	1 + 0.5 + 0.5	100 a	0	0
10. Lorox + Command + Gramoxone	1 + 0.35 + 0.5	100 a	0	0
11. Lorox + Spartan + Gramoxone	1 + 0.19 + 0.5	98 a	0	1.3
12. Lorox + Chateau + Gramoxone	1 + 0.125 + 0.5	94 a	0.5	0
13. Lorox + Zidua + Gramoxone	1 + 0.19 + 0.5	96 a	0.8	0.3

Numbers within a column followed by the same letter are not significantly different according to LSD test at P=0.05.

Treatments 2-6 included MSO at 1% and AMS at 2% (v/v) spray solution.

Treatments 7-13 included COC at 1% (v/v) spray solution.

Cinquefoil control in Peppermint.

Potentilla supina (cinquefoil, formerly *Potentilla paradoxa*), has become more prevalent in wet areas of mint fields in the last several years. Commercial peppermint fields north of Mesa, WA and near Othello had the weed present in 2016 and 2017. Cinquefoil appears to emerge in late summer or fall and can overwinter giving rise to larger sized plants that are not controlled well with dormant season applications of Gramoxone and other mint herbicides. Cinquefoil can act as an annual or short lived perennial. It prefers moist soil and tends to establish first in wet areas of fields. It blooms (yellow flower) from June through August (Figure 1).

Cinquefoil control following six POST applied herbicide treatments is being evaluated (Table 4). Cinquefoil seed was planted in potting soil mix in 6-inch pots and when seedlings emerged pots were placed outdoors at the WSU-Prosser research station. Herbicides were applied May 22, 2017 when seedlings were 5 inches diameter. A nontreated check was included for comparison. Herbicides were applied with a bicycle CO₂ sprayer calibrated to deliver 20 GPA through three, 8002 XR flat fan spray tips. Treatments were replicated 6 times in a RCBD design. Cinquefoil control will be visually estimated on May 25, 2017 (3 DAT), May 30 (8 DAT) and June 5, 2017 (2 WAT).

Initial Results.

Cinquefoil control at 3 DAT was best with paraquat which is a faster acting herbicide than other herbicides tested (Table 4). Some activity was noted with all herbicide treatments and control will be evaluated over several weeks.

Table 4. Bushy cinquefoil (*Potentilla supina*) control following postemergence herbicides at WSU-Prosser. Treatments applied May 22, 2017 when Cinquefoil was 5 inches diameter.

Treatment	Rate Lb ai/a	Cinquefoil Control	
		May 25	June 5
1 Nontreated	--	0 d	
3 Paraquat (Gramoxone) + NIS	0.75	97 a	
5 Saflufenacil (Sharpen) + MSO	0.044	51 b	
2 Saflufenacil (Sharpen) + MCPB (Thistrol) + MSO	0.044 + 0.5	38 bc	
7 Saflufenacil (Sharpen) + Carfentrazone (Aim) + MSO	0.044 + 0.031	50 b	
4 Pyridate (Tough) + MCPB (Thistrol) + MSO	0.95 + 0.5	27 c	
6 Carfentrazone (Aim) + NIS	0.031	29 c	

Figure 1. Bushy cinquefoil plant in bloom.

