Renz Weed Science
COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN–MADISON

Extension
UNIVERSITY OF WISCONSIN–MADISON

UW – Madison Weed Science Renz Lab

Does florpyrauxifen control wild parsnip in native prairies?

Dr. Mark Renz, Professor and Extension Weed Specialist

mrenz@wisc.edu – 357 Moore Hall, 1575 Linden Drive, Madison, WI, 53706

Travis Wilson, Research Specialist

tjwilson9@wisc.edu – 236 Moore Hall, 1575 Linden Drive, Madison, WI, 53706

Objective:

Determine the effectiveness of florpyrauxifen at controlling wild parsnip (*Pastinaca sativa*) in an establishing native prairie.

Summary:

Wild parsnip, while susceptible to many herbicides, these products often also injure/kill desirable forbs in native prairies. SiteVue (florpyrauxifen) is a new product that many native forbs are tolerant to and is effective at controlling wild parsnip. We sought to understand what rates of florpyrauxifen alone or mixed with other products can control wild parsnip in an establishing prairie. All treatments reduced wild parsnip density compared to nontreated controls (25-100% reduction). Few parsnip plants flowered as a result of treatment with SiteVue at 6 and 8 fl. oz/A alone and SiteVue at 4 fl oz/A mixed with Escort having none, 53 days after treatment (7/19). While many wild parsnip plants were not killed at this time they were not flowering and no plants appeared to produce any viable seeds. As seedlings were present at the time of application we assessed seedling survival in October by counting rosettes. While we found no differences in rosette density 130 DAT (10/4) SiteVue at 8 fl oz/A and SiteVue at 4 fl oz/A + Freelex had no rosettes present. This suggests that these treatments eliminated all seedlings and will have no flowering parsnip the following year. Native forb cover was low in plots (<10% cover) with few species, but appears to have been impacted by treatments 53 DAT.

The following year (376 days after treatment), there were no differences among the treatments for parsnip rosettes when compared to the NTC. Despite this, higher rates of SiteVue (6 and 8 fl

oz/a) and mixes of SiteVue 4 fl oz/a + Freelex or Plateau all had 0 rosettes at this time. By July (409 DAT), no differences in flowering parsnip was detected. While the variability was high, treatments that applied SiteVue at 4 fl oz/A alone or in combination with Escort or Freelex had no flowering wild parsnip.

Despite the lack of differences in wild parsnip control, native forbs increased in cover 1 year after treatment as cover improved for all treatments 5 to 10 fold except, SiteVue + Escort 409 DAT. SiteVue 2 fl oz/a, showed similar forb cover as the non-treated control (20-30%), at this time. Results suggest that forbs present had some tolerance to SiteVue and, while injured the year of application, could recover to higher levels by one year after treatment. Future research will need to determine at what level of wild parsnip infestation control is needed to minimize injury to forbs while maximizing control.

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Notes

Trial done in a 5-year-old planted prairie. While a diverse mix was planted, the most common plants were smooth brome, Kentucky bluegrass, sweet clover, Canada goldenrod, yellow coneflower and wild bergamot.

Herbicide Treatments

Treatment Number	Treatment	Rate
1	Nontreated Control (NTC)	-
2	SiteVue	2 fl oz/A
3	SiteVue	4 fl oz/A
4	SiteVue	6 fl oz/A
5	SiteVue	8 fl oz/A
6	SiteVue Escort	4 fl oz/A 0.25 oz/A
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A

***Each treatment includes Methylated Seed Oil (MSO) at a rate of 1 % v/v**

Herbicide Application

Date	May, 27, 2022, 9:20am – 11:09am
Equipment	CO_2 pressurized 10-foot boom sprayer (20 GPA)
Nozzles & spacing	8, Teejet XR 11002VS nozzles with 15-inch spacing
Regulator PSI	48

Weather Data

Weather Station	KMNMINNE506
Temperature	58.8°F – 70.8°F
Wind Speed and Direction	0.9 mph SW – 1.2 mph W
Relative Humidity	48% - 56%
Cloud Cover	0%
Previous Rain Event Within 48 Hours	None
When $\geq$ 0.25 inches of precipitation occurred after treatment	5.5 DAT – 0.26 inches

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Research Plot Information	
Plot Dimensions	10 feet by 25 feet
Design	Randomized Complete Block, 3 blocks
Soil Type	Santiago silt loam
Soil Characteristics	14.1% clay, 0.58% organic matter, 5.9 pH, 4% slope

Plants Present at Application – Developmental Stage

Species	Average Height (in)	Phenological Stage
Wild Parsnip (*Pastinaca sativa*)	9.49	Vegetative

Close up of Wild Parsnip

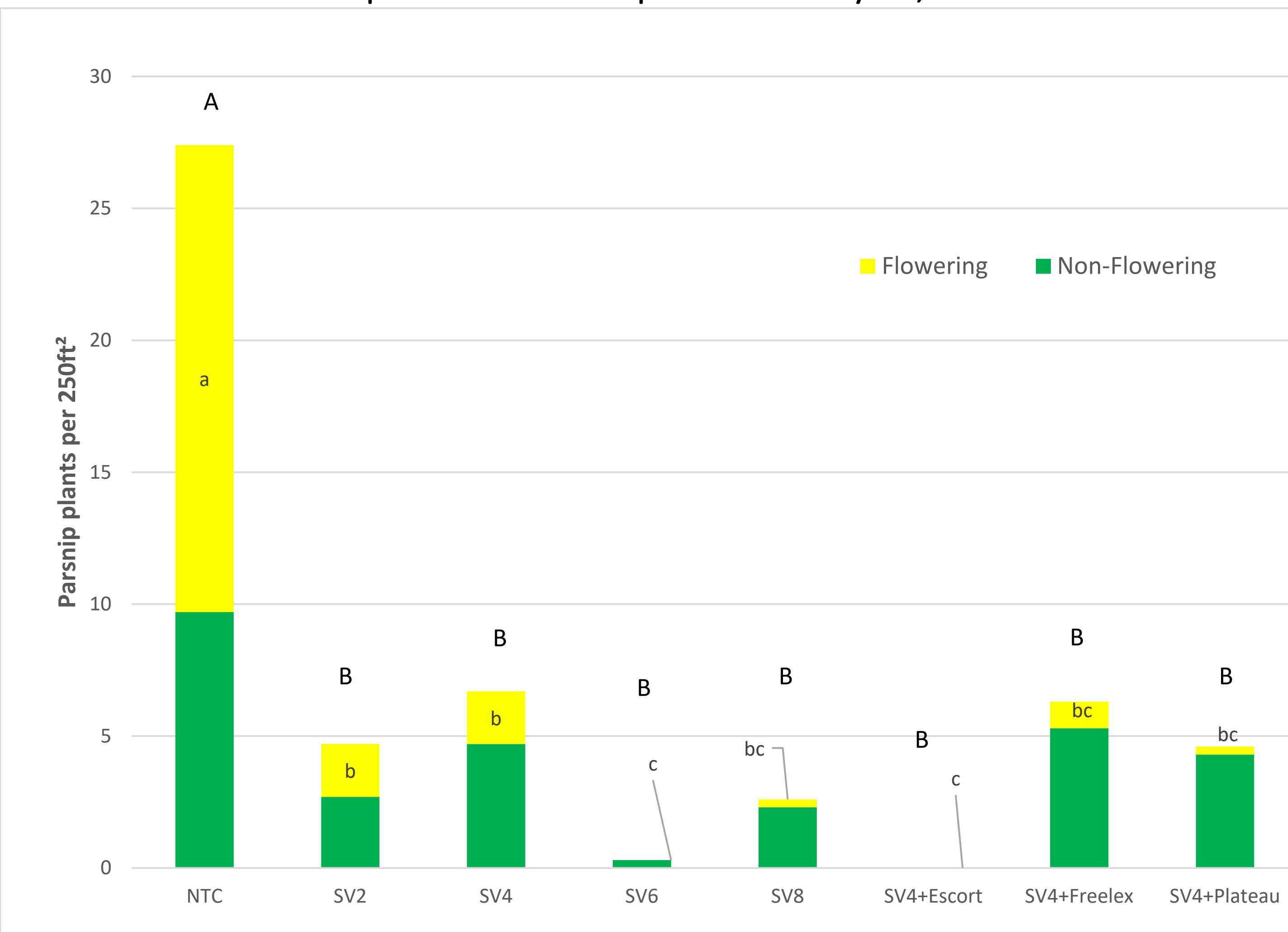
Picture of full site from the North

Pictures above show NTC plot on the left and on right shows plot treated with SiteVue 4 fl oz/a + Escort, 409 DAT. While SiteVue+Escort provided good control of parsnip, it showed to also have a negative impact on native forb cover and produced the lowest amount (3.7%). Note lack of native forb cover and increased amount of smooth brome in the picture to the right.

Index of Ratings and Results

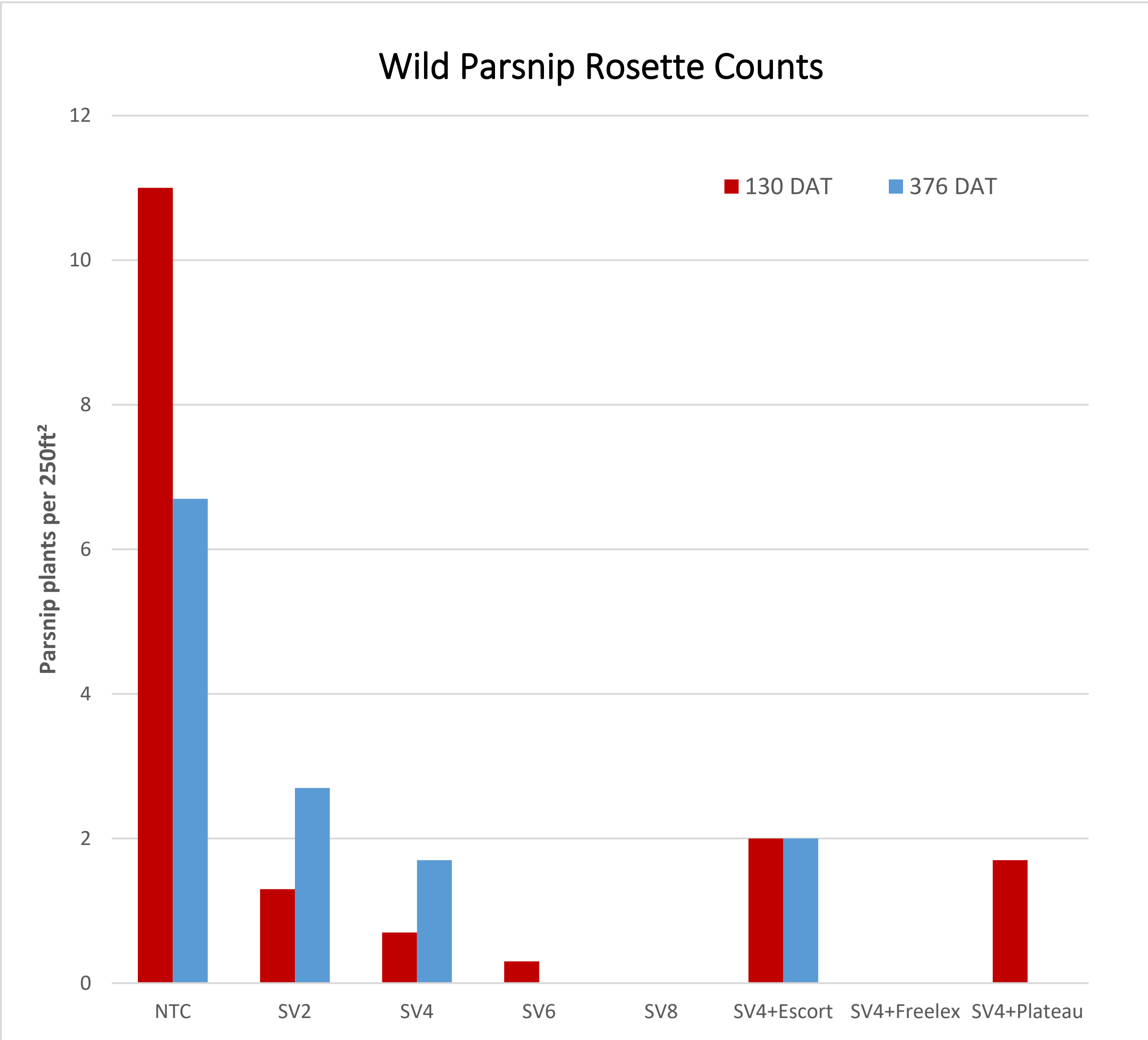
Results:

Reproductive Parsnip Counts – July 19, 2022

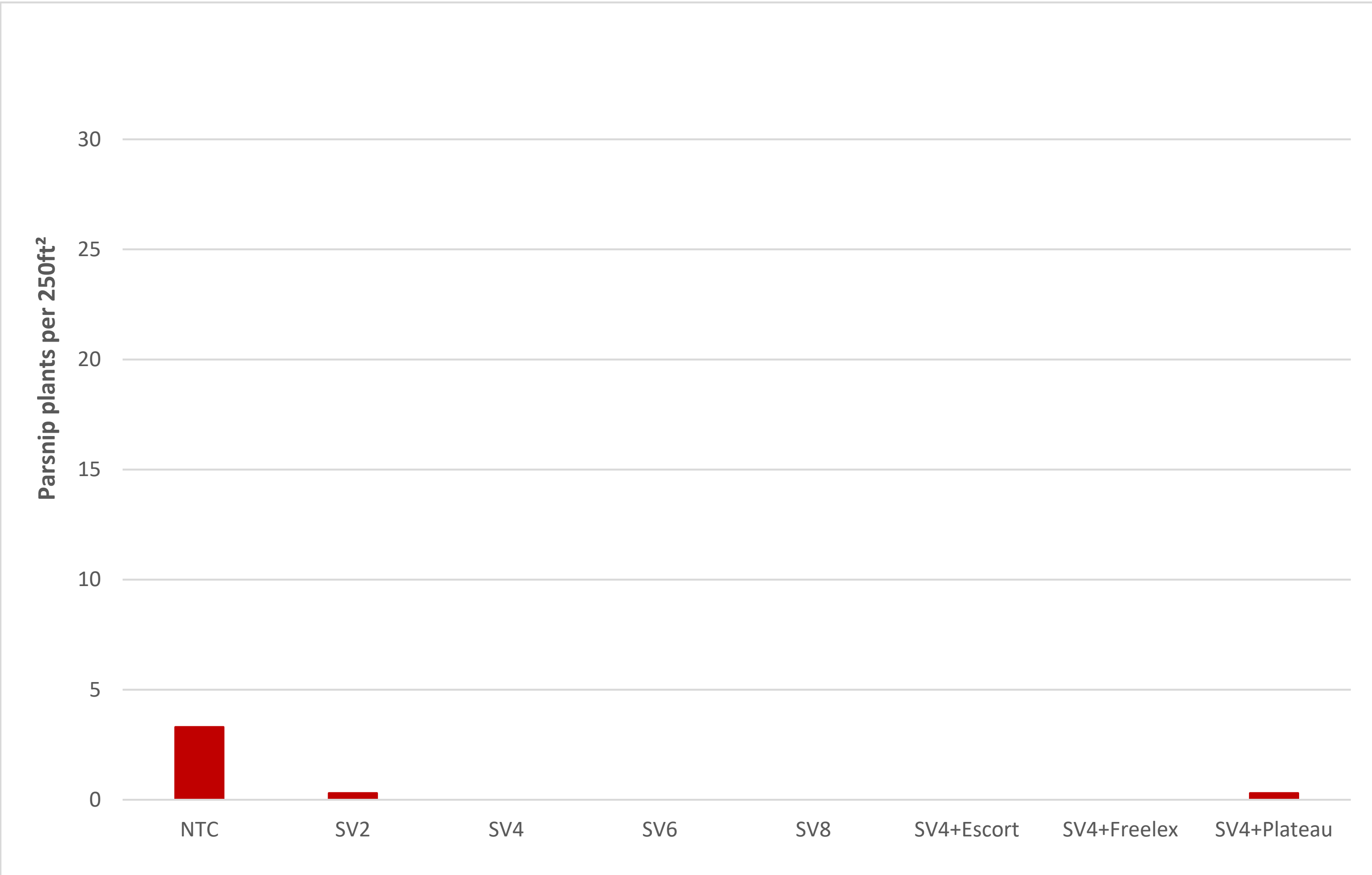


Bars labeled with the same letter do not significantly differ (P=0.05, LSD)

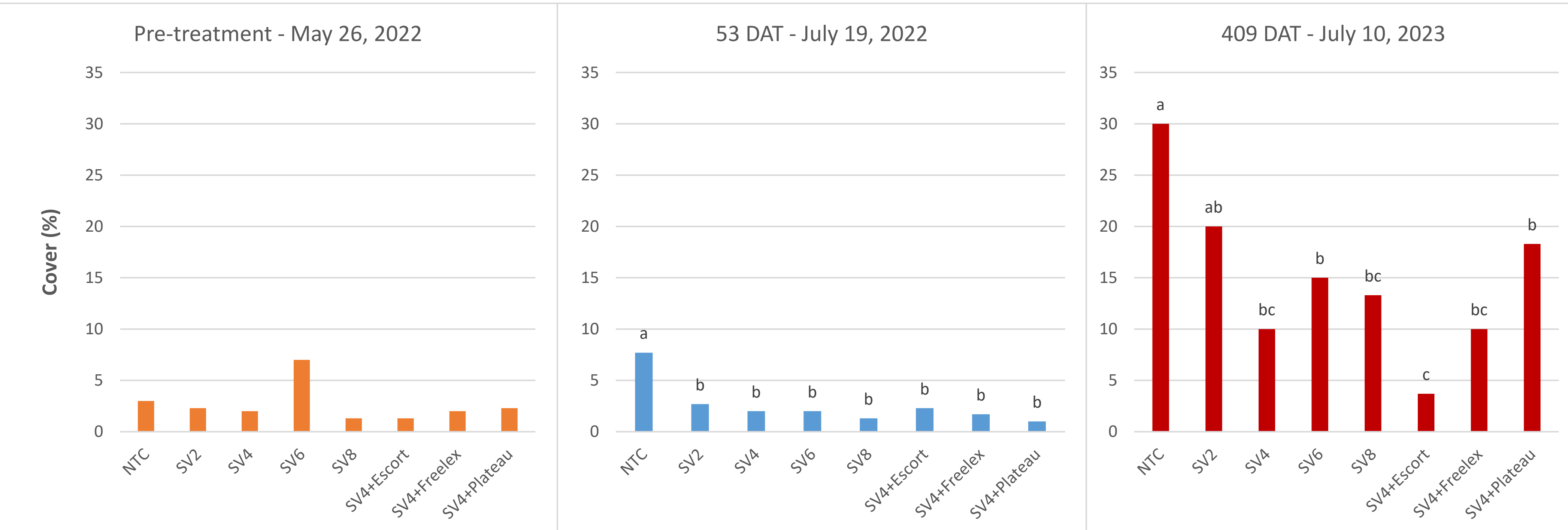
Capitalized letter above bars compares differences between overall (flowering+non-flowering) parsnip counts taken at 53 DA. Lowercase letters compare differences for flowering or non-flowering rosettes, respectively.


Wild Parsnip Rosette Counts
130 DAT
376 DAT
Parsnip plants per 250ft²
0
2
4
6
8
10
12
NTC
SV2
SV4
SV6
SV8
SV4+Escort
SV4+Freelex
SV4+Plateau

Flowering Parsnip – 409 DAT, July 10, 2023



Native Forb Covers



Bars labeled with the same letter do not significantly differ (P=0.05, LSD)

Pre-Treatment Rating – May, 26, 2022 1/2

Trt. No.	Treatment	Rate	Parsnip Counts (#/250ft^2)	Parsnip Seedling Presence (1=Yes/0=No)	Wild Parsnip Cover (%)	Native Forb Cover (%)
1	NTC	-	23.7 -	0.0 -	1.7 -	3 -
2	SiteVue	2 fl oz/A	23.3 -	0.3 -	1.7 -	2.3 -
3	SiteVue	4 fl oz/A	39.7 -	0.7 -	3.7 -	2. -
4	SiteVue	6 fl oz/A	24.3 -	0.7 -	1.7 -	7 -
5	SiteVue	8 fl oz/A	31.7 -	0.3 -	1.7 -	1.3 -
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	25.7 -	0.7 -	2 -	1.3 -
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	34.3 -	0.7 -	2.7 -	2 -
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	44 -	0.3 -	2.3 -	2.3 -
Statistics[1]						
Least Significant Difference (LSD) P=.05			35.15	0.71	2.52	4.48
Standard Deviation			20.07	0.41	1.44	2.56
Coefficient of Variation (CV)			65.1	89.07	66.52	95.91
Treatment Prob(F)			0.8413	0.4105	0.6479	0.2316

Pre-Treatment Rating – May, 26, 2022 2/2

Trt. No.	Treatment	Rate	Non-native Forb Cover (%)	Grass Cover (%)	Canada Goldenrod Cover (%)	Bareground/ Litter (%)
1	NTC	-	3.7 -	26.7 -	13.3 -	51.7 -
2	SiteVue	2 fl oz/A	3.7 -	30 -	16.7 -	46 -
3	SiteVue	4 fl oz/A	4.7 -	26.7 -	17.7 -	48.7 -
4	SiteVue	6 fl oz/A	4.3 -	40 -	15 -	32.0 -
5	SiteVue	8 fl oz/A	7.7 -	30 -	11.7 -	48 -
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	14.3 -	28.3 -	14.3 -	39.7 -
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	4 -	30 -	14 -	47.3 -
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	4.3 -	33.3 -	13.3 -	44.3 -
Statistics[1]						
LSD P=.05			6.72	9.77	17.04	15.94
Standard Deviation			3.84	5.58	9.73	9.10
CV			65.77	18.21	67.1	20.35
Treatment Prob(F)			0.0512	0.1585	0.9958	0.2797

[1] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

53 Days after Treatment (DAT) – July, 19, 2022 1/3							
Trt. No.	Treatment	Rate	Wild Parsnip Counts (#/250ft²)	Flowering Parsnip Counts (#/250ft²)	Non-Flowering Parsnip Counts (#/250ft²)	Wild Parsnip Cover (%)	Canada Goldenrod Cover (%)
1	NTC	-	27.3 a	17.7 a	9.7 -	4 a	31 -
2	SiteVue	2 fl oz/A	4.7 b	2 b	2.7 -	1.3 bc	15.7 -
3	SiteVue	4 fl oz/A	6.7 b	2 b	4.7 -	1.0 bcd	7.3 -
4	SiteVue	6 fl oz/A	0.3 b	0 b	0.3 -	0.3 cd	16 -
5	SiteVue	8 fl oz/A	2.7 b	0.3 b	2.3 -	0.6 bcd	7 -
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	0 b	0 b	0 -	0.0 d	4.7 -
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	6.3 b	1 b	5.3 -	1.7 b	6.3 -
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	4.7 b	0.3 b	4.3 -	1.7 b	14 -
Statistics[2]							
LSD P=.05			10.23	5.71	5.83	1.05	16.21
Standard Deviation			5.84	3.26	3.33	0.60	9.25
CV			88.72	111.82	90.84	44.82	72.58
Treatment Prob(F)			0.0013	0.0001	0.0856	0.0001	0.0596

53 DAT – July, 19, 2022 2/3							
Trt. No.	Treatment	Rate	Sweet Clover Cover (%)	Canada Thistle Cover (%)	Native Grass Cover (%)	Non-native Grass Cover (%)	Native Forb Cover (%)
1	NTC	-	1.3 -	5.3 -	1.3 -	20 -	7.7 a
2	SiteVue	2 fl oz/A	0.0 -	1 -	3.3 -	21.7 -	2.7 b
3	SiteVue	4 fl oz/A	1.7 -	2.7 -	1.7 -	20.7 -	2 b
4	SiteVue	6 fl oz/A	1 -	2 -	6.7 -	19.3 -	2b
5	SiteVue	8 fl oz/A	2 -	2.7 -	1.7 -	20 -	1.3 b
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	0.3 -	2.7 -	0.3 -	17.7 -	2.3 b
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	0.3 -	4 -	5.7 -	21.7 -	1. b
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	3.3 -	3.7 -	0.7 -	21.7 -	1 b
Statistics[2]							
LSD P=.05			2.93	3.52	5.95	13.04	3.10
Standard Deviation			1.67	2.01	3.40	7.45	1.77
CV			133.67	67.01	127.46	36.62	68.62
Treatment Prob(F)			0.3244	0.3209	0.2674	0.9969	0.0098

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

[2] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

53 DAT – July, 19, 2022 3/3							
Trt. No.	**Treatment**	**Rate**	**Bareground/ Litter (%)**	**Canada G-rod Ht. Reduc. (%)**	**Sweet Clover Ht. Reduc. (%)**	**Smooth Brome Ht. Reduc. (%)**	**Parsnip Seedling Presence (1=yes/0=no)**
1	NTC	-	29.3 d	0 d	0 -	0 d	1 -
2	SiteVue	2 fl oz/A	54.3 bc	35 c	-	15 cd	0.3 -
3	SiteVue	4 fl oz/A	63.0 abc	61.7 b	60 -	20 bcd	0.3 -
4	SiteVue	6 fl oz/A	52.7 c	48.3 bc	55 -	16.7 cd	0.0 -
5	SiteVue	8 fl oz/A	64.7 ab	66.7 b	37.5 -	21.7 bc	0.3 -
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	72 a	90.0 a	80 -	76.7 a	0.3 -
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	58.7 bc	36.7 c	85 -	20 bcd	1 -
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	54.0 bc	66.7 b	50 -	38.3 b	0.3 -
Statistics[3]							
LSD P=.05			11.18	18.88	58.78	20.21	0.84
Standard Deviation			6.39	10.78	25.93	11.54	0.48
Coefficient of Variation (CV)			11.39	21.29	49.39	44.32	105.12
Treatment Prob(F)			0.0001	0.0001	0.1170	0.0001	0.2106

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

[3] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

130 DAT – October, 4, 2022								
Trt. No.	Treatment	Rate	Parsnip Rosette Counts (#/250ft^2)	Wild Parsnip Cover (%)	Native Grass Cover (%)	Non-Native Grass Cover (%)	Bareground / Litter (%)	Broadleaf Weed Cover (%)
1	NTC	-	11 -	2.3 -	4 c	23.3 c	18.7 -	51.7 a
2	SiteVue	2 fl oz/A	1.3 -	0.3 -	7 bc	31.7 bc	19.3 -	41.7 ab
3	SiteVue	4 fl oz/A	0.7 -	0.3 -	5.3 bc	30 bc	22.7 -	41.7 ab
4	SiteVue	6 fl oz/A	0.3 -	0.3 -	18.7 ab	28.3 bc	19.3 -	33.3 b
5	SiteVue	8 fl oz/A	0 -	0 -	9 bc	41.7 ab	19.3 -	30 b
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	2 -	2 -	1.7 c	55.0 a	24.3 -	16.7 c
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	0 -	0 -	23.7 a	28.3 bc	19.7 -	28.3 bc
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	1.7 -	0.7 -	2.3 c	41.7 ab	22 -	36.7 ab
Statistics[4]								
LSD P=.05			7.03	2.40	13.50	15.57	9.25	15.15
Standard Deviation			4.01	1.37	7.71	8.89	5.28	8.65
Coefficient of Variation (CV)			188.83	182.86	86.05	25.4	25.56	24.72
Treatment Prob(F)			0.0684	0.3177	0.0291	0.0123	0.8515	0.0085

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

[4] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

376 DAT – June, 7, 2023				
Trt. No.	**Treatment**	**Rate**	**Parsnip Rosette Counts (#/250ft^2)**	**Parsnip Seedling Presence (1=yes/0=no)**
1	NTC	-	6.7 -	0.7 -
2	SiteVue	2 fl oz/A	2.7 -	0.7 -
3	SiteVue	4 fl oz/A	1.7 -	1 -
4	SiteVue	6 fl oz/A	0 -	0.3 -
5	SiteVue	8 fl oz/A	0 -	1 -
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	2 -	0.7 -
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	0 -	0.7 -
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	0 -	0.7 -
Statistics[5]				
LSD P=.05			6.54	0.87
Standard Deviation			3.73	0.49
Coefficient of Variation (CV)			229.81	69.74
Treatment Prob(F)			0.3917	0.7753

[5] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

409 DAT – July, 10, 2023								
Trt. No.	**Treatment**	**Rate**	**Flowering Parsnip Counts ($\#/250ft^2$)**	**Native Grass Cover (%)**	**Non-Native Grass Cover (%)**	**Native Forb Cover (%)**	**Non-Native Forb Cover (%)**	**Bareground / Litter (%)**
1	NTC	-	3.3-	5.3 -	38 d	30 a	18.3 -	8.3 -
2	SiteVue	2 fl oz/A	0.3 -	5 -	55 bcd	20 ab	16.7 -	6.7 -
3	SiteVue	4 fl oz/A	0 -	3.7 -	61.3 abc	10 bc	18.3 -	6.7 -
4	SiteVue	6 fl oz/A	0 -	13.7 -	48 bcd	15 b	18.3 -	5 -
5	SiteVue	8 fl oz/A	0 -	3.7 -	64.7 ab	13.3 bc	11.7 -	6.7 -
6	SiteVue Escort	4 fl oz/A 0.25 oz/A	0 -	0.7 -	80.7 a	3.7 c	6.7 -	8.3 -
7	SiteVue Freelex	4 fl oz/A 1 fl oz/A	0 -	27 -	44.7 cd	10 bc	16.7 -	5 -
8	SiteVue Plateau	4 fl oz/A 2 fl oz/A	0.3 -	3.7 -	48 bcd	18.3 b	23.3 -	6.7 -
Statistics[6]								
LSD P=.05			3.13	15.83	19.57	10.87	12.01	6.37
Standard Deviation			1.79	9.04	11.18	6.20	6.86	3.94
Coefficient of Variation (CV)			357.57	115.42	20.3	41.25	42.2	54.59
Treatment Prob(F)			0.3403	0.0526	0.0088	0.0055	0.2128	0.9110

[6] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.