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Effectiveness of Method 240SL on Bohemian Knotweed (*Fallopia* x *bohemica)*

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Objective:

Determine effectiveness of the herbicide Method 240SL, compared to others, on Bohemian Knotweed (*Fallopia* x *bohemica)*.

Summary:

Bohemian knotweed (*Fallopia* x *bohemica*) is widespread throughout Wisconsin and difficult to control. Past research has shown high rates of Milestone (aminopyralid) applied in the fall can give equivalent control as applications of Arsenal (imazapyr). The benefit of Milestone is that established grasses are not harmed. Additionally, interest exists in comparing the effectiveness of Milestone fall applications to Method (aminocyclopyrachlor) and TerraVue (aminopyralid + florpyrauxifen) as these products are also safe to established grasses. Experiments were established in fall 2022 along a highly infested roadside that had been previously mowed to compare these treatments.

Results in spring of 2023 (236 DAT) show reductions in knotweed cover for all treatments compared to the nontreated control. Cover of knotweed in July (301 DAT) was lowest with either rate of TerraVue or Milestone (cover <15%). While higher rates of Method (16 and 18 fl oz/A) showed promise for control with similar stem counts as Milestone and TerraVue treatments in May (236 DAT), by fall (385 DAT) only Milestone and TerraVue treatments had the fewest stems. While the high rate of TerraVue tended to have the best control, it was not statistically different from the lower rate and Milestone. In 2024 (1.5 YAT), knotweed increased in density among all treated plots. TerraVue @ 5.7 oz/a was the only treatment to have < 10

stems m^{-2}, and while treatments had a 75% in stems, they were not different than Milestone (57% reduction) or the low rate of TerraVue (48% reduction).

Results highlight that products that contain aminopyralid are the most effective at suppressing bohemian knotweed, without injuring grasses. While populations were suppressed, they were not eliminated by treatments containing aminopyralid and had substantial regrowth two years after treatment. The regrowth may have been due to the late application timing after a light frost. This could have limited translocation of herbicides and reduced control. While TerraVue shows promise as an effective herbicide, it did not eradicate knotweed, even at the high application rate.

Notes

Knotweed leaves showed between 10-20% leaf injury at time of herbicide application.
Trial area was mowed twice during the 2023 growing season which may affect results.

Herbicide Treatments

Treatment Number	Treatment	Rate
1	Nontreated Control (NTC)	-
2	Method 240SL NIS	14 fl oz/A 0.25% v/v
3	Method 240SL NIS	16 fl oz/A 0.25% v/v
4	Method 240SL NIS	18 fl oz/A 0.25% v/v
5	Milestone NIS	14 fl oz/A 0.25% v/v
6	TerraVue NIS	2.8 fl oz/A 0.25% v/v
7	TerraVue NIS	5.7 fl oz/A 0.25% v/v

Herbicide Application

Date	September 29, 2022, 11:50am – 12:40pm
Equipment	CO_2 pressurized 10-foot boom sprayer (20 GPA)
Nozzles & spacing	8 Teejet XR 11002VS nozzles, with 15-inch spacing
Regulator PSI	46

Weather Data	
Weather Station	KWISTOUG29
Temperature	64.1°F – 70.2°F
Wind Speed and Direction	1.0 mph S – 0.2 mph S
Relative Humidity	64% - 59%
Cloud Cover	15%
Previous Rain Event Within 48 Hours	None
When ≥ 0.25 inches of precipitation occurred after treatment	October 13, 2022, 12:53pm – 0.26 inches

Research Plot Information	
Plot Dimensions	10 feet by 20 feet
Design	Randomized Complete Block, 4 blocks
Soil Type	Sable silty clay loam
Soil Characteristics	29.0% clay, 1.96% organic matter, 6.9 pH, 0.5% slope

Plants Present at Application – Developmental Stage		
Species	**Average Height (in)**	**Phenological Stage**
Bohemian Knotweed (*Fallopia* x *bohemica)*	19	Vegetative (mowed during summer)

Picture shows trial area which is evenly infested with bohemian knotweed. Note that trial is located on a roadside that is periodically mowed therefore there is a combination of grasses mixed in with knotweed. Plots were treated perpendicular to the road.

Index of Ratings and Results

Bohemian Knotweed Cover 8

Bohemian Knotweed Stem Counts 9

Pre-Treatment – September 29, 2022 10

7 Days After Treatment (DAT) – October 6, 2022 11

236 DAT– May 23, 2023 12

301 DAT – July 27, 2023 13

385 DAT – October 19, 2023 14

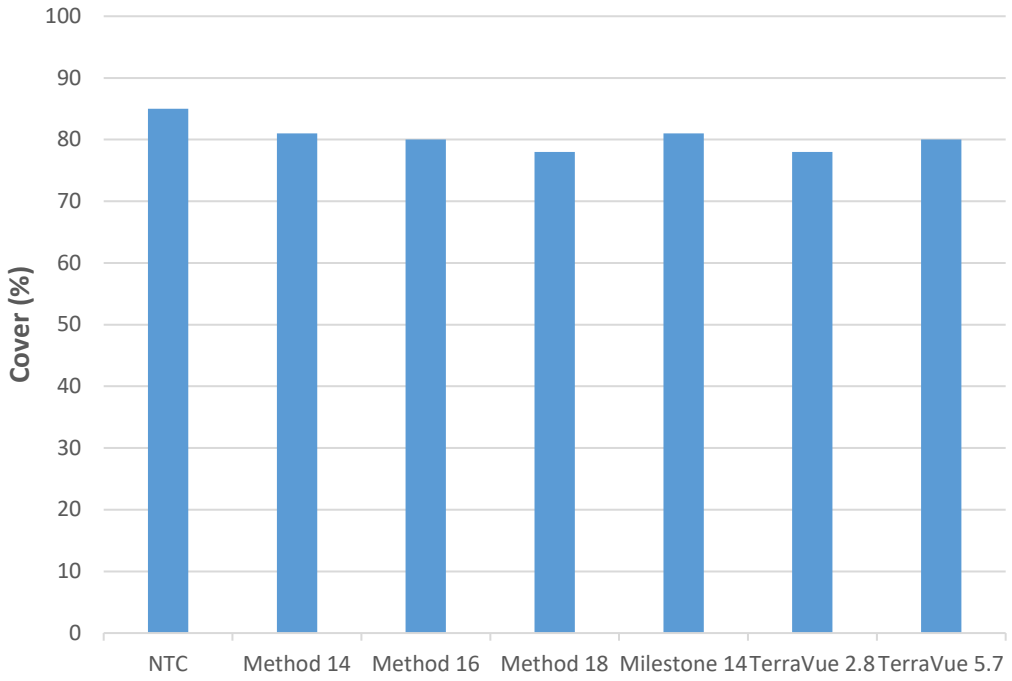
607 DAT – May 28, 2024 15

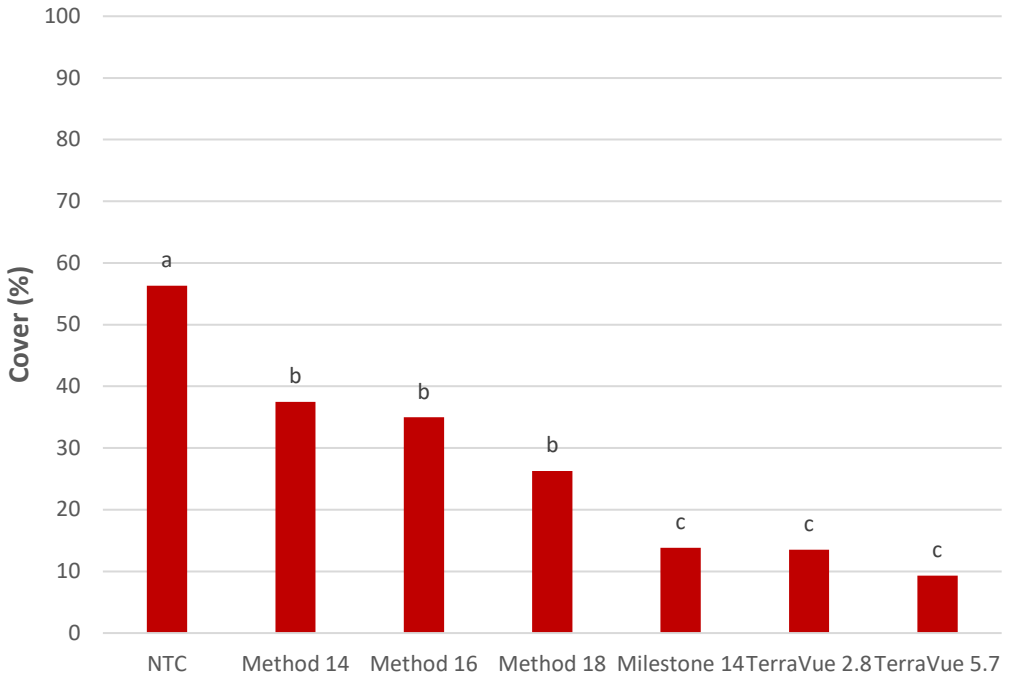
Picture shows nontreated control plot on May 28, 2024 (607 DAT) which had the highest number of knotweed stems/m² (37.5) at this time.

Picture taken on May 28, 2024 (607 DAT) shows plot treated with TerraVue @ 5.7 oz/a, which showed the lowest number of knotweed stems/m² (9.5). Notice lack of visible knotweed in plot.

Results:

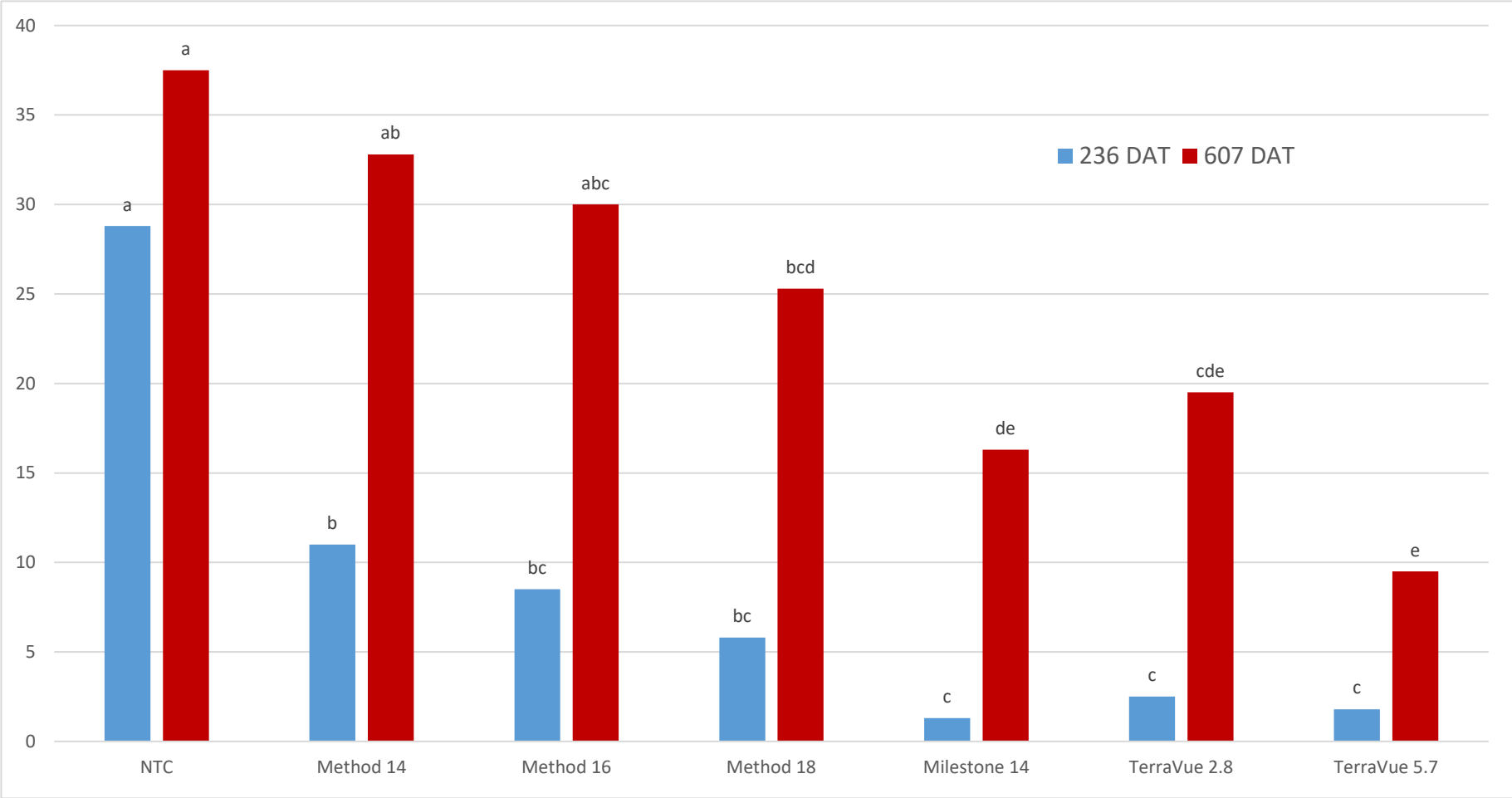
Bohemian Knotweed Cover





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

Bohemian Knotweed Stem Counts



Bars label of the same color with the same letter do not significantly differ (P=0.05, LSD).

Pre-Treatment – September 29, 2022				
Trt. No.	**Treatment**	**Rate**	**Bohemian Knotweed Cover (%)**	**Grass Cover (%)**
1	NTC	-	85 -	15 -
2	Method 240SL	14 fl oz/A	81 -	19 -
3	Method 240SL	16 fl oz/A	80 -	20 -
4	Method 240SL	18 fl oz/A	78 -	23 -
5	Milestone	14 fl oz/A	81 -	19 -
6	TerraVue	2.8 oz/A	78 -	23 -
7	TerraVue	5.7 oz/A	80 -	19 -
Statistics[1]				
Least Significant Difference (LSD) P=.05			7.65	7.34
Standard Deviation			5.15	4.94
Coefficient of Variation (CV)			6.4	25.38
Treatment Prob(F)			0.4552	0.4013

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

7 Days After Treatment (DAT) – October 6, 2022			
Trt. No.	**Treatment**	**Rate**	**Bohemian Knotweed Injury (%)**
1	NTC	-	50 b*
2	Method 240SL	14 fl oz/A	60 a
3	Method 240SL	16 fl oz/A	65 a
4	Method 240SL	18 fl oz/A	63 a
5	Milestone	14 fl oz/A	61 a
6	TerraVue	2.8 fl oz/A	66 a
7	TerraVue	5.7 fl oz/A	65 a
Statistics[2]			
LSD P=.05			8.77
Standard Deviation			5.90
CV			9.61
Treatment Prob(F)			0.0180

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

* Frosts occurred after applications and may be impacting ashy sunflower injury in NTC plots 7 DAT.

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

236 DAT– May 23, 2023								
Trt. No.	**Treatment**	**Rate**	**Bohemian Knotweed Cover (%)**	**Grass Cover (%)**	**Day Lily Cover (%)**	**Broadleaf Weed Cover (%)**	**Bareground / Litter Cover (%)**	**Bohemian Knotweed stems (m^{-2})***
1	NTC	-	72.5 a	18.8 b	5 c	3.8 d	0 d	28.8 a
2	Method 240SL	14 fl oz/A	28.8 b	33.8 b	7.5 bc	10 a	20 bc	11 b
3	Method 240SL	16 fl oz/A	17.5 c	32.5 b	10 abc	11.3 a	30 ab	8.5 bc
4	Method 240SL	18 fl oz/A	9 cd	35.8 b	7.8 bc	10 a	37.5 a	5.8 bc
5	Milestone	14 fl oz/A	5.5 d	56 a	20 ab	2.3 b	15 c	1.3 c
6	TerraVue	2.8 fl oz/A	10.3 cd	56.3 a	21.3 a	2.5 b	10 cd	2.5 c
7	TerraVue	5.7 fl oz/A	2 d	57 a	21.3 a	2.5 b	17.3 c	1.8 c
Statistics[3]								
Least Significant Difference (LSD) P=.05			9.98	17.53	12.78	4.28	11.06	8.28
Standard Deviation			6.72	11.80	8.60	2.88	7.45	5.57
Coefficient of Variation (CV)			32.31	28.48	64.92	47.76	40.18	65.57
Treatment Prob(F)			0.001	0.0009	0.0398	0.0002	0.0001	0.0001

* Knotweed stems were counted in a 1 m^2 quadrat

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

301 DAT – July 27, 2023								
Trt. No.	**Treatment**	**Rate**	**Bohemian Knotweed Control (%)**	**Bohemian Knotweed Cover (%)**	**Bohemian Knotweed Cover Change* (%)**	**Grass Cover (%)**	**Day Lily Cover (%)**	**Bareground / Litter Cover (%)**
1	NTC	-	41.3 c	56.3 a	-28.8 a	13.8 c	7.5 c	22.5 ab
2	Method 240SL	14 fl oz/A	56.3 b	37.5 b	-43.8 b	22.5 bc	16.3 c	23.8 a
3	Method 240SL	16 fl oz/A	61.3 b	35 b	-45 b	31.3 b	13.8 c	21.3 ab
4	Method 240SL	18 fl oz/A	65 b	26.3 b	-51.3 bc	31.5 b	22.5 bc	20 ab
5	Milestone	14 fl oz/A	80 a	13.8 c	-67.5 d	32.5 ab	38.8 ab	15 bc
6	TerraVue	2.8 fl oz/A	84.5 a	13.5 c	-61.5 cd	31 b	39.3 a	16.3 abc
7	TerraVue	5.7 fl oz/A	85.8 a	9.3 c	-70.8 d	47.5 a	38.8 ab	9.5 c
Statistics[4]								
Least Significant Difference (LSD) P=.05			13.73	11.74	12.75	15.96	16.69	7.65
Standard Deviation			9.25	7.90	8.58	10.74	11.23	5.15
Coefficient of Variation (CV)			13.65	28.88	0.0	35.85	44.48	28.11
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0146	0.0017	0.0126

* Cover change found using cover from September 29, 2022 and subtracting the cover from July 27, 2023
[4] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

385 DAT – October 19, 2023			
Trt. No.	**Treatment**	**Rate**	**Bohemian Knotweed stems (m^{-2})***
1	NTC	-	61.3 a
2	Method 240SL	14 fl oz/A	45.8 ab
3	Method 240SL	16 fl oz/A	30.8 bc
4	Method 240SL	18 fl oz/A	33.8 bc
5	Milestone	14 fl oz/A	12.5 d
6	TerraVue	2.8 fl oz/A	20.5 cd
7	TerraVue	5.7 fl oz/A	10.3 d
Statistics[5]			
LSD P=.05			16.74
Standard Deviation			11.27
CV			36.73
Treatment Prob(F)			0.0001

* Knotweed stems were counted in a 1 m^2 quadrat

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

607 DAT – May 28, 2024			
Trt. No.	**Treatment**	**Rate**	**Bohemian Knotweed stems (m^{-2})***
1	NTC	-	37.5 a
2	Method 240SL	14 fl oz/A	32.8 ab
3	Method 240SL	16 fl oz/A	30 abc
4	Method 240SL	18 fl oz/A	25.3 bcd
5	Milestone	14 fl oz/A	16.3 de
6	TerraVue	2.8 fl oz/A	19.5 cde
7	TerraVue	5.7 fl oz/A	9.5 e
Statistics[5]			
LSD P=.05			12.00
Standard Deviation			8.08
CV			33.11
Treatment Prob(F)			0.00

* Knotweed stems were counted in a 1 m^2 quadrat

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