Renz Weed Science
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Extension
UNIVERSITY OF WISCONSIN-MADISON

ID #19-3

UW – Madison Weed Science Renz Lab

Can Esplanade Accelerate Establishment of Pollinator-Friendly Forb Species through Suppression of Annual Weeds? (2019 Experiment)

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Objective:

Determine if applications of Esplanade (indaziflam) or Method (aminocyclopyrachlor) applied before emergence of planted pollinator-friendly forb species and weeds (PRE) or after weed emergence (POST) can increase establishment and cover of planted forbs than standard herbicides.

Summary:

Although applications of Esplanade and Journey resulted in additional bareground cover (11 – 45%) compared to other treatments (0 – 1%) at 39 DAT, these treatments had similarly low native forb species cover at 130 DAT (0.5 – 2%) compared to other treatments (0 – 0.5%). No forbs were observed in Method treatments at either timing.

In the year following application, Method both PRE and POST provided lower broadleaf weed cover (2-12%) than applications of Esplanade, Journey, or Plateau (17-41%). Broadleaf cover was likely increased in treatments with successful grass control the previous year. PRE applications of Journey continued to provide the lowest grass cover (45%), and native forb cover was similar to the untreated control. Treatments containing imazapic (Journey applied PRE, Plateau applied POST, 9-12% cover) did have higher native forb cover than other herbicides treatments (0-2% cover).

Results suggest that late spring and early summer applications of Esplanade or Method do not improve cover of native forbs in the establishment year compared to standard treatments or non-treated areas. Poor forb establishment may have been the result of application timing, as annual weeds emerged shortly after PRE applications. Earlier applications (1-2 months prior to emergence) could have provided better annual weed control, but also may have increased injury to native forbs and grasses.

Research Plot Information:

Plot Dimensions: 10 Feet by 30 Feet

Design: Randomized Complete Block, 4 blocks

Soil Type: Fayette silt loam

Notes:

- Research plots burndown sprayed on May 31st, 2019 with Roundup PowerMax (32 fluid ounces per acre) + Alliance liquid ammonium sulfate (160 fluid ounces per acre)
- Research plots no-till seeded on June 3rd, 2019 at 20 pounds per acre with rolled oats carrier

Herbicide Treatments:

Treatment Number	Treatment	Application Timing	Rate
1	Untreated Control	-	-
2	Method 240SL	A	1 ounce per acre (oz/A)
3	Method 240SL	A	2 oz/A
4	Method 240SL	A	4 oz/A
5	Esplanade	A	1 oz/A
6	Esplanade	A	2 oz/A
7	Esplanade	A	4 oz/A
8	Journey	A	5.35 fluid ounces per acre (fl oz/A)
9	Method 240SL Non-Ionic Surfactant (NIS)	B	1 oz/A 0.25% volume by volume (v/v)
10	Method 240SL NIS	B	2 oz/A 0.25% v/v
11	Method 240SL NIS	B	4 oz/A 0.25% v/v
12	Plateau NIS	B	1.84 fl oz/A 0.25% v/v

Herbicide Application:

Timing	A-Timing	B-Timing
Date	June 6th, 2019	July 15th, 2019
Time	12:15pm – 1:00pm	12:30pm – 1:15pm
Weed Species Phenology	no weeds present (burndown application on May 31st, 2019)	**Broadleaf Weeds**
		common dandelion (3", post-flower)
		pigweed species (5", vegetative)
		white clover (2", vegetative)
		Grass Weeds
		crabgrass species (5", vegetative)
		foxtail species (4", vegetative)
		corn (6", vegetative)
Native Forb Phenology	Not emerged	seedlings

Equipment: Backpack sprayer (20 GPA) with 10-foot boom

Nozzles: Eight (8) Flat Tip XR TeeJet 11002 VS on 15-inch nozzle spacing

Regulator PSI: 38

Boom PSI: 26

Weather Data:

Weather Station	KWILANCA5	
Application Timing	**A-Timing**	**B-Timing**
Temperature	82°F	89°F
Wind Speed and Direction	4.2mph N	8.6mph S
Relative Humidity	78%	76%
Cloud Cover	-	50%
Previous Rain Event Within 48 Hours	June 5th, 2019 – 0.26 inches	-
When ≥ 0.25 inches of precipitation occurred after treatment	June 8th, 2019 – 0.80 inches	July 19th, 2019 – 1.72 inches

Index of Ratings and Results

Results:

39 Days after First Treatment. July 15th, 2019.

Trt. No.	Treatment	Application Timing	Rate	Broadleaf Weed Cover (%)	Grass Cover (%)	Bareground/ Litter Cover (%)	Native Broadleaf Cover (%)
1	UTC	-	-	0.3 cd	99.8 a	0.0 d	0.0 b
2	Method 240SL	A	1 oz/A	0.0 d	100.0 a	0.0 d	0.0 b
3	Method 240SL	A	2 oz/A	0.0 d	100.0 a	0.0 d	0.0 b
4	Method 240SL	A	4 oz/A	0.0 d	99.8 a	0.3 d	0.0 b
5	Esplanade	A	1 oz/A	1.3 abc	76.3 bc	22.5 bc	0.0 b
6	Esplanade	A	2 oz/A	1.0 bcd	87.8 ab	11.3 cd	0.0 b
7	Esplanade	A	4 oz/A	1.5 ab	53.5 d	45.0 a	0.0 b
8	Journey	A	5.35 fl oz/A	2.0 a	68.5 c	28.8 b	0.8 a
9	Method 240SL NIS	B	1 oz/A 0.25% v/v	0.0 d	100.0 a	0.0 d	0.0 b
10	Method 240SL NIS	B	2 oz/A 0.25% v/v	0.3 cd	99.8 a	0.0 d	0.0 b
11	Method 240SL NIS	B	4 oz/A 0.25% v/v	0.5 cd	99.0 a	0.5 d	0.0 b
12	Plateau NIS	B	1.84 fl oz/A 0.25% v/v	0.0 d	100.0 a	0.0 d	0.0 b
Statistics[1]							
Least Significant Difference (LSD) P=.05				0.74	11.54	11.80	0.21
Standard Deviation				0.51	8.02	8.20	0.14
Coefficient of Variation (CV)				91.22	8.88	90.94	230.94
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001

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

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

77 Days after First Treatment, 38 Days after Second Treatment – August 22nd, 2019

Trt. No.	Treatment	Application Timing	Rate	Broadleaf Weed Cover (%)	Grass Cover (%)	Bareground/ Litter Cover (%)	Native Broadleaf Cover (%)
1	UTC	-	-	0.0 -	95.3 -	4.8 -	0.0 -
2	Method 240SL	A	1 oz/A	0.0 -	93.5 -	6.5-	0.0 -
3	Method 240SL	A	2 oz/A	0.0 -	93.8 -	6.3-	0.0 -
4	Method 240SL	A	4 oz/A	0.0 -	93.0 -	7.0-	0.0 -
5	Esplanade	A	1 oz/A	1.5 -	90.0 -	8.5-	0.0 -
6	Esplanade	A	2 oz/A	0.8 -	95.0 -	4.0-	0.3 -
7	Esplanade	A	4 oz/A	3.3 -	90.8 -	7.0-	0.0 -
8	Journey	A	5.35 fl oz/A	1.3 -	94.5 -	3.5-	0.8 -
9	Method 240SL NIS	B	1 oz/A 0.25% v/v	0.0 -	94.3 -	5.8-	0.0 -
10	Method 240SL NIS	B	2 oz/A 0.25% v/v	0.0 -	96.0 -	4.0-	0.0 -
11	Method 240SL NIS	B	4 oz/A 0.25% v/v	0.8 -	93.5 -	5.8-	0.0 -
12	Plateau NIS	B	1.84 fl oz/A 0.25% v/v	1.3 -	88.8 -	10.0-	0.0 -
Statistics							
LSD P=.05				2.06	7.20	6.08	0.45
Standard Deviation				1.43	5.01	4.23	0.31
CV				196.17	5.37	69.48	371.73
Treatment Prob(F)				0.0763	0.6458	0.6187	0.0546

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

130 Days after First Treatment, 91 Days after Second Treatment – October 14th, 2019

Trt. No.	Treatment	Application Timing	Rate	Broadleaf Weed Cover (%)	Grass Cover (%)	Bareground/ Litter Cover (%)	Native Broadleaf Cover (%)
1	UTC	-	-	1.0 -	36.3 -	62.8 -	0.0 b
2	Method 240SL	A	1 oz/A	1.0 -	46.3 -	52.8 -	0.0 b
3	Method 240SL	A	2 oz/A	0.5 -	43.8 -	55.8 -	0.0 b
4	Method 240SL	A	4 oz/A	0.8 -	32.5 -	66.8 -	0.0 b
5	Esplanade	A	1 oz/A	0.5 -	43.8 -	55.3 -	0.5 b
6	Esplanade	A	2 oz/A	1.0 -	38.8 -	59.8 -	0.5 b
7	Esplanade	A	4 oz/A	1.0 -	53.8 -	44.8 -	0.5 b
8	Journey	A	5.35 fl oz/A	3.0 -	52.5 -	42.8 -	1.8 a
9	Method 240SL NIS	B	1 oz/A 0.25% v/v	1.3 -	45.0 -	53.8 -	0.0 b
10	Method 240SL NIS	B	2 oz/A 0.25% v/v	0.5 -	51.3 -	48.3 -	0.0 b
11	Method 240SL NIS	B	4 oz/A 0.25% v/v	0.3 -	42.5 -	57.3 -	0.0 b
12	Plateau NIS	B	1.84 fl oz/A 0.25% v/v	1.0 -	51.3 -	47.3 -	0.5 b
Statistics							
LSD P=.05				1.49	15.57	16.04	0.61
Standard Deviation				1.04	10.82	11.15	0.43
CV				105.71	24.16	20.67	136.69
Treatment Prob(F)				0.0859	0.1671	0.1179	0.0001

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

396 Days after First Treatment, 357 Days after Second Treatment – July 6th, 2020

Trt. No.	Treatment	Application Timing	Rate	Broadleaf Weed Cover (%)	Grass Cover (%)	Bareground/ Litter Cover (%)	Native Broadleaf Cover (%)
1	UTC	-	-	19.3 ab	71.5 a	2.8 -	6.5ab
2	Method 240SL	A	1 oz/A	8 b	89.5 a	1.8 -	0.8 b
3	Method 240SL	A	2 oz/A	7.5 b	90 a	1.8 -	0.8 b
4	Method 240SL	A	4 oz/A	6.8 b	92.8 a	0.5 -	0 b
5	Esplanade	A	1 oz/A	18.8 ab	80.3 a	0.5 -	0.5 b
6	Esplanade	A	2 oz/A	21.3 ab	74.8 a	2.3 -	1.8 b
7	Esplanade	A	4 oz/A	22.5 ab	74.5 a	1 -	2 b
8	Journey	A	5.35 fl oz/A	41.3 a	45.3 b	1.8 -	11.8 a
9	Method 240SL NIS	B	1 oz/A 0.25% v/v	8 b	90 a	1.8 -	0.3 b
10	Method 240SL NIS	B	2 oz/A 0.25% v/v	2.8 b	93 a	3.5 -	0.8 b
11	Method 240SL NIS	B	4 oz/A 0.25% v/v	12.5 b	85.8 a	1.5 -	0.3 b
12	Plateau NIS	B	1.84 fl oz/A 0.25% v/v	17 ab	71.5 a	2.3 -	9.3 a
Statistics							
LSD P=.05				17.84	18.84	2.51	4.86
Standard Deviation				12.4	13.1	1.75	3.38
CV				80.24	16.39	98.64	117.5
Treatment Prob(F)				0.0102	0.0005	0.475	0.0001

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