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UW – Madison Weed Science Renz Lab

Wildflower Establishment with Milestone or TerraVue

2019 Update

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Objective:

Determine the tolerance of common native forb species used in prairie restorations to Milestone and TerraVue.

Summary:

68 Days After Treatment (DAT)

All treatments resulted in high levels of common yarrow injury (100%). TerraVue at the high rate severely injured heath aster, rosinweed, stiff goldenrod and yellow coneflower (>90% injury). Stiff goldenrod injury was minimal with all treatments other than the high rate of TerraVue, while yellow coneflower displayed moderate injury from Milestone and the low rate of TerraVue.

1 Year after Treatment (YAT)

The site was burned in spring of the year after herbicide application (2019). While injury symptoms were minimal in 2019, populations of forbs changed due to fire. When averaged across all treatments, rosinweed populations were eliminated, while cover of yellow coneflower, stiff goldenrod, common yarrow, and heath aster was reduced by 45-85%.

Common yarrow suffered high rates of mortality in Milestone treatments (≥80% cover reduction), but surviving plants displayed no injury. Milestone eliminated stiff goldenrod populations, although TerraVue only reduced populations by 33-50%. Yellow coneflower displayed low tolerance to both Milestone (62-77% cover reduction) and was eradicated by TerraVue.

Research Plot Information:

Plot Dimensions: 10 x 25 feet

Design: Randomized Complete Block, 4 blocks

Soil Type: 80% Batavia silt loam, 0 – 2 percent slope, 20% Grays silt loam, 2 – 6 percent slope

Notes:

Some present forb species had too low of density to statistically analyze, including Wild Bergamot (*Monarda fistulosa*), prairie sagewort (*Artemisia frigida*), rattlesnake master (*Eryngium yuccifolium*), golden alexanders (*Zizea aurea*), purple coneflower (*Echinacea purpurea*), and indigo (*Baptisia sp.*).

Herbicide Treatments:

Treatment Number	Treatment	Rate
1	Untreated Control (UTC)	-
2	Milestone Methylated Seed Oil (MSO)	5 fluid ounces per acre (oz/A) 0.5% volume/volume (v/v)
3	Milestone MSO	7 oz/A 0.5% v/v
4	TerraVue MSO	2 ounces of dry weight per acre (oz wt/A) 0.5% v/v
5	TerraVue MSO	2.85 oz wt/A 0.5% v/v

Herbicide Application:

Date: June 7th, 2018, 12:45pm – 1:15pm

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

Nozzles: Eight Flat Tip XR TeeJet 11002 VS; 15-inch nozzle spacing

Regulator PSI: 38

Boom PSI: 26

Plants Present/Stage of Development:

Weeds: White clover (*Trifolium repens*), red clover (*Trifolium pretense*), common dandelion (*Taraxacum officinale*), wild carrot (*Daucus carota*), burdock (*Articum sp.*), alfalfa (*Medicago sp.*), sweet clover (*Melilotus albus*), black medic (*Medicago lupulina*), fleabane (*Erigeron sp.*), quackgrass (*Elymus repens*), and fescue (*Festuca sp.*).

Native Forbs and Grasses:

Wild bergamot (*Monarda fistulosa*), prairie sagewort (*Artemisia frigida*), heath aster (*Symphyotrichum ericoides*), rattlesnake master (*Eryngium yuccifolium*), golden alexanders (*Zizea aurea*), rosinweed (*Silphium integrifolium*), purple coneflower (*Echinacea purpurea*), indigo (*Baptisia sp.*), indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and little bluestem (*Schizachyrium scoparium*).

Weather Data:

Weather Station	KWIMIDDL23
Temperature	75°F
Wind Speed and Direction	1.9 mph SE
Relative Humidity	69.6%
Cloud Cover	20%
Previous Rain Event Within 48 Hours	-
When ≥ 0.25 inches of precipitation occurred after treatment	06.10.18 – 2.12 inches

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Results:

Key to Injury Ratings:				
Tolerant (0-15% injury)	Moderately Tolerant (16-50% injury)	Moderately Susceptible (51-75% injury)	Susceptible (76-100% injury)	No Data

Treatment 1 – Untreated Control		% visual injury (# of quadrats present)			% cover reduction in quadrats with species initially present	% change in # of quadrats with species present
Common Name	*Scientific Name*	2 WAT	1 MAT	2 MAT	1.5 YAT	
common yarrow	*Achillea millefolium*	0 (6)	0 (6)	0 (6)	81	- 12
heath aster	*Symphyotrichum ericoides*	5 (1)	ND	ND	100	+ 12
rosinweed	*Silphium integrifolium*	0 (1)	0 (1)	0 (2)	100	- 6
stiff goldenrod	*Solidago rigida*	0 (3)	0 (3)	0 (3)	50	+ 6
yellow coneflower	*Ratibida pinnata*	0 (7)	0 (7)	0 (8)	70	- 12

Treatment 2 – Milestone (5 fl oz/A)		% visual injury (# of quadrats present)			% cover reduction in quadrats with species initially present	% change in # of quadrats with species present
Common Name	*Scientific Name*	2 WAT	1 MAT	2 MAT	1.5 YAT	
common yarrow	*Achillea millefolium*	33 (7)	56* (8)	100 (7)	80	0
heath aster	*Symphyotrichum ericoides*	45 (3)	60 (3)	60 (3)	42	0
rosinweed	*Silphium integrifolium*	ND	ND	ND	ND	+ 25
stiff goldenrod	*Solidago rigida*	0 (1)	0 (1)	5 (1)	100	+ 12
yellow coneflower	*Ratibida pinnata*	34* (7)	44* (7)	51* (7)	77	- 6

Treatment 3 – Milestone (7 fl oz/A)		% visual injury (# of quadrats present)			% cover reduction in quadrats with species initially present	% change in # of quadrats with species present
Common Name	*Scientific Name*	2 WAT	1 MAT	2 MAT	1.5 YAT	
common yarrow	*Achillea millefolium*	45 (5)	72* (6)	100 (5)	81	- 12
heath aster	*Symphyotrichum ericoides*	30 (2)	38 (2)	15 (2)	22	+ 56
rosinweed	*Silphium integrifolium*	40 (1)	60 (1)	50 (1)	100	- 6
stiff goldenrod	*Solidago rigida*	5 (5)	5 (1)	35 (4)	100	+ 6
yellow coneflower	*Ratibida pinnata*	50* (8)	49* (8)	76* (8)	62	- 31

(*) indicates significant difference from UTC at P=.05, Student-Newman-Keuls

Key to Injury Ratings:				
Tolerant (0-15% injury)	Moderately Tolerant (16-50% injury)	Moderately Susceptible (51-75% injury)	Susceptible (76-100% injury)	No Data

Treatment 4 – TerraVue (2 oz wt/A)		% visual injury (# of quadrats present)			% cover reduction in quadrats with species initially present	% change in # of quadrats with species present
Common Name	*Scientific Name*	2 WAT	1 MAT	2 MAT	1.5 YAT	
common yarrow	*Achillea millefolium*	65* (2)	70* (2)	100 (2)	7	0
heath aster	*Symphyotrichum ericoides*	ND	ND	ND	ND	+ 12
rosinweed	*Silphium integrifolium*	35 (2)	56 (3)	90 (3)	100	- 12
stiff goldenrod	*Solidago rigida*	10 (5)	12 (4)	28 (4)	50	+ 6
yellow coneflower	*Ratibida pinnata*	40* (10)	57* (11)	77* (11)	100	- 62

Treatment 5 – TerraVue (2.85 oz wt/A)		% visual injury (# of quadrats present)			% cover reduction in quadrats with species initially present	% change in # of quadrats with species present
Common Name	*Scientific Name*	2 WAT	1 MAT	2 MAT	1.5 YAT	
common yarrow	*Achillea millefolium*	53 (5)	66* (5)	100 (4)	50	- 18
heath aster	*Symphyotrichum ericoides*	ND	ND	ND	ND	+ 38
rosinweed	*Silphium integrifolium*	40 (1)	70 (1)	90 (1)	100	- 6
stiff goldenrod	*Solidago rigida*	60 (1)	80 (1)	90 (1)	33	+ 12
yellow coneflower	*Ratibida pinnata*	52* (10)	71* (10)	92* (10)	100	- 50

(*) indicates significant difference from UTC at P=.05, Student-Newman-Keuls