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UW – Madison Weed Science Renz Lab

Autumn Olive (*Elaeagnus umbellata*) Management with TerraVue

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Objective:

Determine the efficacy of TerraVue (aminopyralid + florpyrauxifen) as a foliar application for control of autumn olive as compared to established standards.

Summary:

At 3 weeks after treatment (WAT), all treatments resulted in >90% autumn olive leaf necrosis except for Milestone alone (72% leaf necrosis). Predominant grasses at the site were Kentucky bluegrass and smooth brome, and qualitative observations suggested that smooth brome may have been more injured by some treatments than others. However, grass injury was pooled across species at this rating. At 3 months after treatment (MAT), all treated shrubs dropped most of their leaves (>75%). As a result of shrubs dropping most of their leaves, leaf necrosis was difficult to assess. Smooth brome injury ranged between 11-25% regardless of treatment.

The year after application (363 DAT) high levels of control were observed with all treatments providing >95% control except Milestone alone (83%). By September (433 DAT) all treatments still provided high levels of control (82-100%) with few resprouts observed. Based on fall ratings and resprouts, autumn olive mortality was 100% when TerraVue was applied at 0.228 oz./gal + 2% Vastlan or Milestone was applied with 0.75% Vastlan. All other treatments also showed a high level of mortality (>80%) except Milestone.

Two years after applications similar trends were observed. TerraVue alone at either rate or mixed with Vastlan provided effective control as did Milestone + Vastlan. Milestone continued to provide moderate control (56.7%) while Vastlan alone at 0.75% v/v or mixed with TerraVue provided more variable results although they were similar to the best treatments. Data suggests that in order to maximize shrub mortality (100%) and prevent resprouting Milestone or TerraVue should be mixed triclopyr.

This experiment documents that TerraVue alone or mixed with Vastlan can control autumn olive and result in high shrub mortality. Milestone application should be mixed with triclopyr to obtain similar results.

Herbicide Treatments		
Treatment Number	**Treatment**	**Rate**
1	Milestone	0.25% volume/volume (v/v)
2	TerraVue	0.114 ounces/gallon (oz/gal)
3	TerraVue	0.228 oz/gal
4	Vastlan	0.75% v/v
5	Milestone Vastlan	0.25% v/v 0.75% v/v
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v
8	TerraVue Vastlan	0.114 oz/gal 2% v/v

Note: All treatments contain 1% methylated seed oil (MSO) at 1% volume by volume

Herbicide Application	
Date	July 2nd, 2020, 10:35am – 12:35pm
Equipment	CO_2 pressurized single nozzle sprayer (50 GPA)
Nozzles & spacing	One TeeJet flat fan even 8002E nozzle
Regulator PSI	42

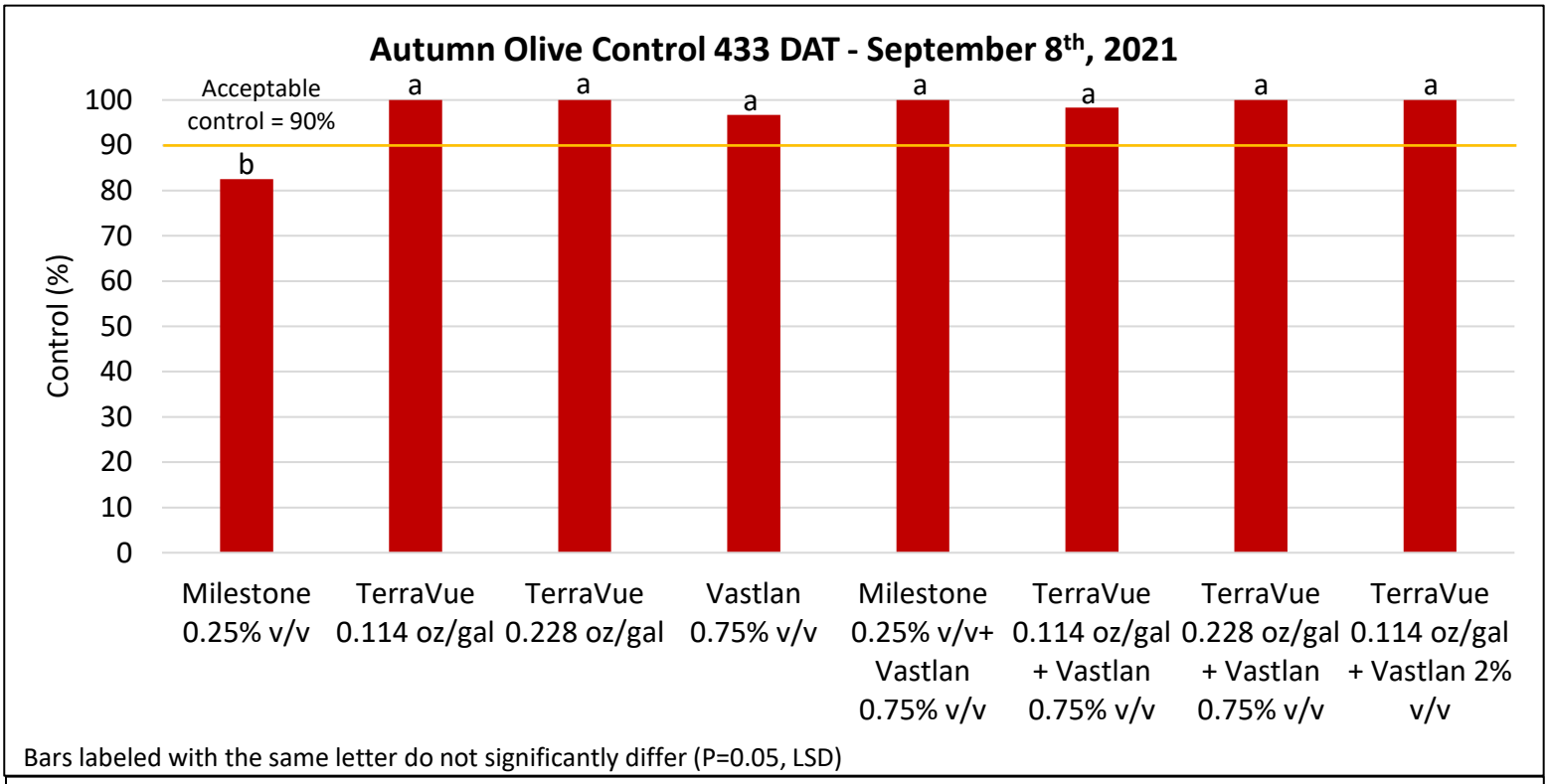
Weather Data	
Weather Station	KWIMERRI1
Temperature	82°F - 86°F
Wind Speed and Direction	0 mph – 1 mph
Relative Humidity	76% - 78%
Cloud Cover	10%
Previous Rain Event Within 48 Hours	NONE
When ≥ 0.25 inches of precipitation occurred after treatment	July 3rd, 2020, 8:00pm – 0.45 inches

Research Plot Information	
Plot Dimensions	single shrub
Design	Randomized Complete Block, 6 blocks
Soil Type	St. Charles silt loam
Soil Characteristics	18.6% clay, 0.8% organic matter, 6.7 pH, 4% slope

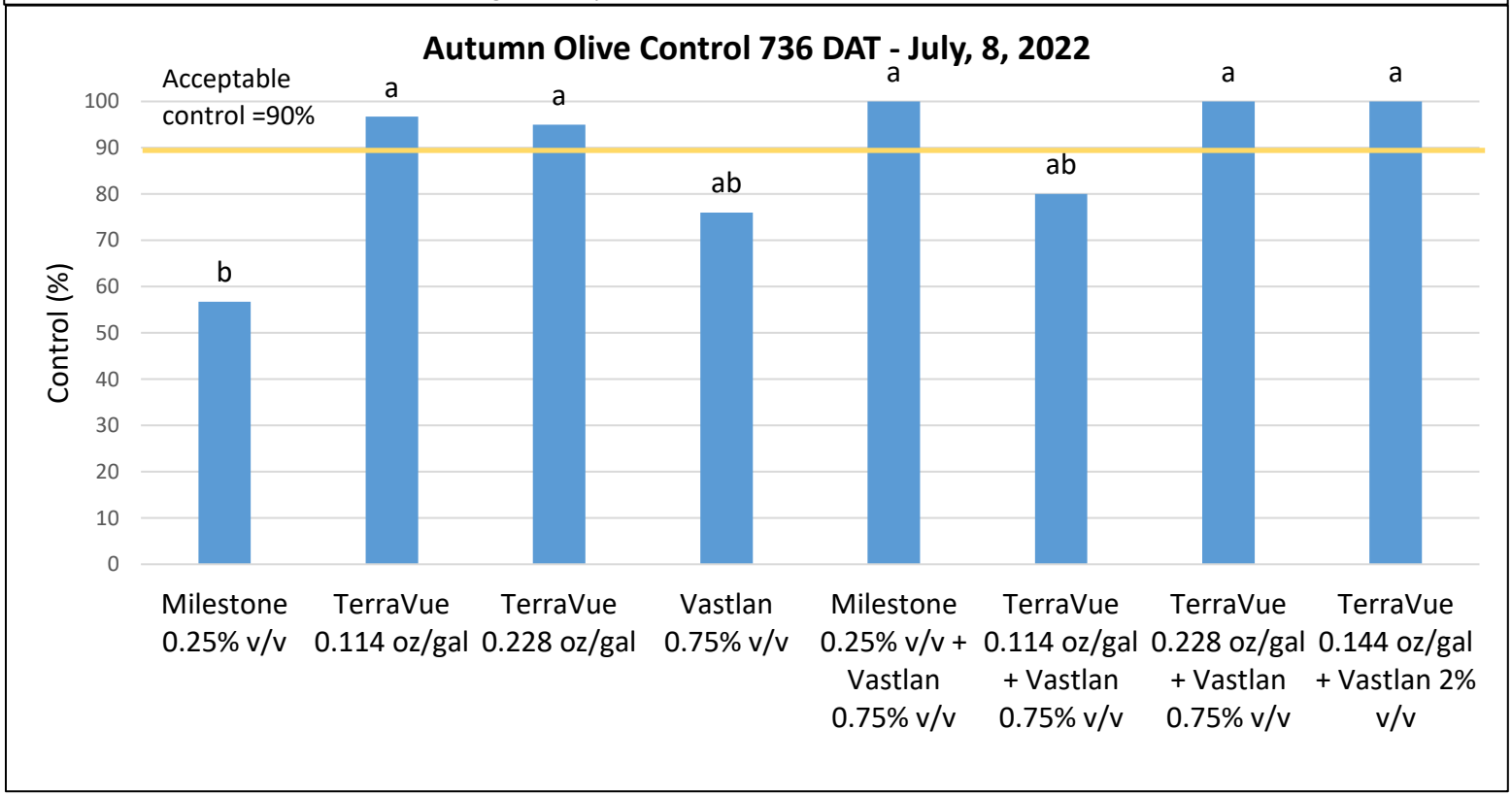
Vastlan 0.75% v/v at 3 MAT

Milestone 0.25% v/v at 3 MAT.
Arrows are pointing to areas on shrub still showing growth.

Index of Ratings and Results



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



Results:

21 Days After Treatment (DAT) – July 23rd, 2020					
Trt. No.	**Treatment**	**Rate**	**autumn olive leaf necrosis (%)**	**root uptake injury (0-1)[1]**	**grass injury (%)**
1	Milestone	0.25% v/v	72 b	0 -	3 d
2	TerraVue	0.114 oz/gal	100 a	0 -	3 d
3	TerraVue	0.228 oz/gal	100 a	0 -	13 abc
4	Vastlan	0.75% v/v	94 a	0 -	9 bcd
5	Milestone Vastlan	0.25% v/v 0.75% v/v	100 a	0 -	6 cd
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v	100 a	0 -	8 bcd
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v	100 a	0 -	16 ab
8	TerraVue Vastlan	0.114 oz/gal 2% v/v	100 a	0 -	18 a
Statistics[2]					
Least Significant Difference (LSD) P=.05			11.44	.	8.97
Standard Deviation			9.76	0	7.65
Coefficient of Variation (CV)			10.19	0	78.84
Treatment Prob(F)			0.0001	1	0.0073

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

[1] 1 = off-target injury observed, 0 = **no** off-target injury observed
[2] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

83 DAT – September 23rd, 2020					
Trt. No.	Treatment	Rate	autumn olive leaf drop (%)	smooth brome injury (%)	Kentucky bluegrass injury (%)
1	Milestone	0.25% v/v	78 -	10 -	45 -
2	TerraVue	0.114 oz/gal	86 -	13 -	9 -
3	TerraVue	0.228 oz/gal	90 -	20 -	26 -
4	Vastlan	0.75% v/v	88 -	25 -	29 -
5	Milestone Vastlan	0.25% v/v 0.75% v/v	95 -	14 -	23 -
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v	96 -	16 -	29 -
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v	96 -	11 -	38 -
8	TerraVue Vastlan	0.114 oz/gal 2% v/v	98 -	20 -	46 -
Statistics[3]					
LSD P=.05			21	13.76	28.92
Standard Deviation			17.92	11.71	24.45
CV			19.64	73.02	82.25
Treatment Prob(F)			0.5551	0.4589	0.3647

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.

363 DAT – June 30th, 2021				
Trt. No.	**Treatment**	**Rate**	**Autumn Olive Control (%)**	**Autumn Olive Resprouts (#/shrub)**
1	Milestone	0.25% v/v	83 b	0.5-
2	TerraVue	0.114 oz/gal	100 a	0-
3	TerraVue	0.228 oz/gal	100 a	0-
4	Vastlan	0.75% v/v	97 a	0-
5	Milestone Vastlan	0.25% v/v 0.75% v/v	100 a	0-
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v	98 a	0.2-
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v	100 a	0-
8	TerraVue Vastlan	0.114 oz/gal 2% v/v	100 a	0.2-
Statistics[4]				
LSD P=0.05			11.02	0.43
Standard Deviation			9.39	0.37
CV			9.67	343.24
Treatment Prob(F)			0.0359	0.2396

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.

433 DAT – September 8th, 2021				
Trt. No.	**Treatment**	**Rate**	**Autumn Olive Control (%)**	**Autumn Olive Resprouts (#/shrub)**
1	Milestone	0.25% v/v	82-	0.3-
2	TerraVue	0.114 oz/gal	87-	0.8-
3	TerraVue	0.228 oz/gal	100-	0.2-
4	Vastlan	0.75% v/v	100-	1-
5	Milestone Vastlan	0.25% v/v 0.75% v/v	100-	0-
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v	87-	0.2-
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v	100-	0-
8	TerraVue Vastlan	0.114 oz/gal 2% v/v	100-	0.2-
Statistics[5]				
LSD P=0.05			22.79	1.38
Standard Deviation			19.43	1.18
CV			20.61	345.42
Treatment Prob(F)			0.459	0.745

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

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

Autumn Olive Mortality 433 DAT – September 8th, 2021							
Trt. No.	**Treatment**	**Rate**	**Dead Small Autumn Olive Shrubs (#)**	**Dead Medium Autumn Olive Shrubs (#)**	**Dead Large Autumn Olive Shrubs (#)**	**Total Dead Autumn Olive Shrubs (#)**	**Total Autumn Olive Mortality (%)**
1	Milestone	0.25% v/v	0	0	1	1	17
2	TerraVue	0.114 oz/gal	1	4	0	5	83
3	TerraVue	0.228 oz/gal	1	3	2	6	100
4	Vastlan	0.75% v/v	0	4	1	5	83
5	Milestone Vastlan	0.25% v/v 0.75% v/v	3	1	2	6	100
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v	1	3	1	5	83
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v	2	3	1	6	100
8	TerraVue Vastlan	0.114 oz/gal 2% v/v	1	3	2	6	100
			No stats*	No stats*	No stats*	No stats*	No stats*

*Was not able to conduct statistical analysis as data is summed across replications. Raw data presented

736 DAT – July, 8, 2022					
Trt. No.	**Treatment**	**Rate**	**Autumn Olive Control (%)**	**Autumn Olive Resprouts (#/shrub)**	**Autumn Olive Alive/Dead (1=alive/0=dead)**
1	Milestone	0.25% v/v	56.7 b	8.3 a	0.8 a
2	TerraVue	0.114 oz/gal	96.7 a	1.4 b	0.2 b
3	TerraVue	0.228 oz/gal	95.0 a	1.1 b	0.2 b
4	Vastlan	0.75% v/v	76.0 ab	5.6 ab	0.4 ab
5	Milestone Vastlan	0.25% v/v 0.75% v/v	100 a	0.0 b	0.0 b
6	TerraVue Vastlan	0.114 oz/gal 0.75% v/v	80.0 ab	3.3 ab	0.3 ab
7	TerraVue Vastlan	0.228 oz/gal 0.75% v/v	100 a	0.0 b	0.0 b
8	TerraVue Vastlan	0.114 oz/gal 2% v/v	100 a	0.0 b	0.0 b
Statistics[6]					
LSD P=0.05			25.42	4.81	0.44
Standard Deviation			21.56	4.08	0.38
CV			24.49	165.82	155.81
Treatment Prob(F)			0.0115	0.0090	0.0083

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

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