Milestone VM® for Roadside Weed Control

Introduction

Milestone VM (active ingredient aminopyralid) is a relatively new compound for right-of-way vegetation management. First introduced in 2005, this compound has been researched mostly as a thistle control product (Canada and musk) by researchers at the University of Kentucky. As with any new product, more data can be compiled on general weed control as well as specific species problematic to industrial landowners (i.e. common teasel, poison hemlock, etc). Long term studies need to be installed as well to determine any residual activity that aminopyralid may have in reducing the regeneration potential for these species. Two trials were installed in 2006 to examine aminopyralid's ability to control 1) musk thistle and 2) musk thistle, common teasel, poison hemlock, and general broadleaf weed control. These two trials were permanently marked and GPS positions recorded to allow the determination of control levels the following growing season. The two trials were installed on the Gene Snyder Expressway (I-265) near Billtown Road (exit 19). Although both trials utilized the same treatments list, the methods and materials vary slightly between the two studies and will be discussed separately.

Musk Thistle Trial

Methods and Materials

The study area was in the cloverleaf area of exit 19 with an even distribution of musk thistle. Seven herbicide treatments were installed in a randomized complete block design with four replications (Table 1). Plots were 10' X 30' and treated at 20 GPA on April 13, 2006 using a CO_2 powered sprayer mounted on an ATV. Visual measurements of percent control were taken 27, 62, and 109 DAT. Musk thistle counts were taken 165 DAT using a 1 m^2 sampling square with three sub samples per plot. Data were analyzed using ARM and treatment means were separated using Fisher's LSD at $p = 0.05$.

Results

There were no statistically significant differences detected among treatments 27 DAT (Table 1). The does appear to be a difference in rate of burndown; however, as Milestone VM at 7 oz / ac resulted in 93 % control (or burndown) while the 2,4-D + Telar tank mix only resulted in 70 % burndown (although not statistically different). There were no differences detected for percent control or burndown between treatments at the 62 or 109 DAT. All treatments provided excellent control of musk thistle 109 DAT.

There were no significant differences in the number of musk thistle plants counted per square meter 165 DAT (Table 1). This trial will be re-evaluated in the summer of 2007 for plant parts per square meter and compared to the untreated area to determine the treatments efficacy in reducing musk thistle densities.

Table 1: Summary Statistics for Musk Thistle Control

Trt		Treatment		Rate	Percent Control			Musk Thistle Counts
No.	Type	Name	Rate	Unit	27 DAT	62 DAT	109 DAT	Per m^2
1	HERB	Milestone VM	5	fl oz/a	73.3 a	99 a	99 a	0.3 a
	ADJ	NIS	0.25	% v/v				
2	HERB	Milestone VM	5	fl oz/a	83.3 a	96.8 a	99 a	0.3 a
	HERB	Garlon 3A	32	fl oz/a				
	ADJ	NIS	0.25	% v/v				
3	HERB	Milestone VM	5	fl oz/a	89.5 a	99 a	99 a	0.1 a
	HERB	Garlon 3A	12	fl oz/a				
	HERB	Vista	8	fl oz/a				
	ADJ	NIS	0.25	% v/v				
4	HERB	Milestone VM	5	fl oz/a	90.8 a	99 a	99 a	0.0 a
	HERB	2,4-D Amine	32	fl oz/a				
	ADJ	NIS	0.25	% v/v				
5	HERB	Milestone VM	7	fl oz/a	93 a	99 a	99 a	0.2 a
	ADJ	NIS	0.25	% v/v				
6	HERB	2,4-D Amine	32	fl oz/a	70 a	99 a	99 a	0.2 a
	HERB	Telar	0.25	oz/a				
	ADJ	NIS	0.25	% v/v				
7	HERB	2,4-D Amine	64	fl oz/a	83.3 a	99 a	99 a	0.3 a
	ADJ	NIS	0.25	% v/v				
LSD (P=.05)					24.18	2.53	0.00	0.36
Standard Deviation					16.28	1.70	0.00	0.24
CV					19.54	1.72	0.0	144.75
Bartlett's X2					5.759	0.0	0.0	5.148
P(Bartlett's X2)					0.451	.	.	0.398
Replicate F					5.451	1.000	0.000	7.364
Replicate Prob(F)					0.0076	0.4155	1.0000	0.0020
Treatment F					1.172	1.000	0.000	0.636
Treatment Prob(F)					0.3637	0.4552	1.0000	0.6999

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

Common Teasel, Musk Thistle, Poison Hemlock, and General Weed Control

Methods and Materials

The study area was on a cut slope along the westbound lane of I-265 just east of exit 19. The same seven herbicide treatments tested above were tested in a randomized complete block design with four replications. Plots were linear, 10' by 30', and treated on May 5, 2006 using a TeeJet® BoomJet boomless tip on a CO_2 powered sprayer mounted on an ATV. All treatments included Activator 90 at 0.25 % v/v and were applied at 25 GPA. Vegetation present at installation included musk thistle, crown vetch, teasel, and poison hemlock.

Overall weed control and control by species was visually estimated 41 DAT and overall weed control was again evaluated 88 DAT. Data were analyzed using ARM and treatment means were separated using Fisher's LSD at p = 0.05.

Results

Treatments that included Milestone VM resulted in significantly higher control of musk thistle than 2,4-D alone at 64 fl oz / ac 41 DAT (Table 2). This result contradicts that of the trial reported above; however, treatments in that trial were applied one month earlier. This indicates the fast burndown effect that Milestone VM has as compared to that of 2,4-D when musk thistle plants are further along in the bolting / flowering process. The Milestone VM at 5 fl oz, Milestone VM at 5 fl oz + Garlon 3A at 32 fl oz, and Milestone VM at 5 fl oz + 2,4-D at 32 fl oz / ac were significantly higher than the 2,4-D + Telar tank mix and the 2,4-D alone treatments at the same evaluation.

There were no differences detected in crown vetch control with any treatment tested at 41 DAT. All treatments were effective in controlling crown vetch.

Only two treatments had poison hemlock densities high enough across all replications to include in analysis. Milestone VM at 5 fl oz + 2,4-D at 32 fl oz provided significantly higher burndown of poison hemlock than Milestone VM alone at 7 fl oz at 41 DAT.

The same trend exists between control levels with teasel as shown with musk thistle. Treatments that included Milestone VM had significantly higher control of teasel than 2,4-D alone at 64 fl oz at 41 DAT. All Milestone VM treatments except the Milestone VM + Garlon 3A tank mix resulted in higher burndown levels than the 2,4-D + Telar and 2,4-D alone treatments.

Overall weed control followed the same trends as control of musk thistle and teasel discussed above at 41 DAT. All treatment differences were removed; however, when evaluated 88 DAT. This indicates the quick visual symptomology of Milestone VM yet 2,4-D and Telar's ability to provide equivalent control levels 2 months after treatment.

This trial will be re-evaluated in the summer of 2007 for control of musk thistle, poison hemlock, and teasel to determine the treatments efficacy in reducing weed species densities.

Table 2: Summary Statistics for Musk Thistle, Teasel, Poison Hemlock, and Overall Weed Control

Trt No.	Type	Treatment Name	Rate	Rate Unit	Percent Control					
					Musk Thistle	Crown Vetch	Teasel	Poison Hemlock	Overall	Overall
					41 DAT	41 DAT	41 DAT	41 DAT	41 DAT	88 DAT
1	HERB	Milestone VM	5	fl oz/a	90 a	87 a		99 a	88 ab	100 a
	ADJ	NIS	0.25	% v/v						
2	HERB	Milestone VM	5	fl oz/a	93 a	99 a		85 ab	91 a	100 a
	HERB	Garlon 3A	32	fl oz/a						
	ADJ	NIS	0.25	% v/v						
3	HERB	Milestone VM	5	fl oz/a	88 ab	99 a		90 a	90 a	100 a
	HERB	Garlon 3A	12	fl oz/a						
	HERB	Vista	8	fl oz/a						
	ADJ	NIS	0.25	% v/v						
4	HERB	Milestone VM	5	fl oz/a	91 a	99 a	70 a	89 a	89 ab	100 a
	HERB	2,4-D Amine	32	fl oz/a						
	ADJ	NIS	0.25	% v/v						
5	HERB	Milestone VM	7	fl oz/a	88 ab	99 a	60 b	90 a	87 abc	100 a
	ADJ	NIS	0.25	% v/v						
6	HERB	2,4-D Amine	32	fl oz/a	71.3 bc	87 a		68 bc	72 bc	100 a
	HERB	Telar	0.25	oz/a						
	ADJ	NIS	0.25	% v/v						
7	HERB	2,4-D Amine	64	fl oz/a	68.3c	99 a		58 c	70 c	100 a
	ADJ	NIS	0.25	% v/v						
LSD (P=.05)					17.51	23.22	0.00	18.24	17.865	0.00
Standard Deviation					11.37	14.24	0.00	9.13	12.020	0.00
CV					13.47	14.91	0.0	11.04	14.33	0.0
Bartlett's X2					6.322	0.168	0.0	1.481	12.308	0.0
P(Bartlett's X2)					0.388	0.682	.	0.83	0.055	.
Replicate F					0.384	0.767	0.000	0.035	0.090	0.000
Replicate Prob(F)					0.7666	0.5441	1.0000	0.9659	0.9647	1.0000
Treatment F					3.206	0.691	0.000	7.755	2.263	0.000
Treatment Prob(F)					0.0407	0.6648	1.0000	0.0125	0.0837	1.0000

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