Non-typical and Generic Products for Total Vegetation Management

Introduction

Noncrop and industrial vegetation management has seen an influx of new products available both as new active ingredients and existing active ingredients offered by generic and niche product marketing. Milestone VM (a.i. aminopyralid), a relatively new product manufactured by Dow Agrosciences, is a growth regulator type herbicide used for broadleaf weed control. Aminopyralid provides some level of residual weed control for species such as musk thistle, Canada thistle, and marestail. Payload (a.i. flumioxazin), manufactured by Valent Professional Products, is a PPO herbicide labeled for preemergent uses for broadleaf and grass control on bareground sites. Diuron 80DF (a.i. diuron), manufactured by Vegetation Manager, is a photosynthesis inhibitor herbicide labeled for preemergent control of many annual and perennial grasses and herbaceous weeds. Casoron (a.i. dichlobenil), manufactured by Chemtura, is a meristimatic inhibitor herbicide labeled for preemergent perennial and annual grass and herbaceous weed control in nurseries and noncrop sites.

A trial was installed in May of 2006 comparing these products for total vegetation control in industrial sites.

Methods and Materials

Eight treatments were evaluated in a randomized complete block trial located at I-75 and Iron Works Pike in Fayette County, Kentucky. Plots were 5' X 20' with a 3' running check between plots. Herbicide applications were made with a CO_2 powered sprayed at 25 GPA on May 19, 2006. All treatments, including the check, included RoundUp Pro at 2 qt / ac to decrease weed pressure and also included Activator 90 surfactant at 0.25 % v/v. Vegetation at trial establishment included tall fescue, annual lespedeza, and bluegrass. Evaluations for percent bareground were made preapplication, 35 days after treatment (DAT), 77 DAT, and 111 DAT. Vegetation percent cover by species was measured 77 and 111 DAT.

Percent bareground preapplication was tested for significant difference to determine appropriate data analysis technique (i.e. ANOVA versus ANCOVA). No significant differences were detected with percent bareground at initiation so subsequent data analysis was performed using ANOVA with Fisher's LSD at $p = 0.05$ for treatment mean separation. Percent cover of vegetation 77 and 111 DAT were compared using simple averages and were not statistically analyzed. Information pertaining to vegetative cover by treatment will be presented here for comparison purposes only and possess no statistical inference.

Results and Discussion

35 DAT

Payload alone at 12 oz / ac resulted in 47 % bareground which was statistically similar to RoundUp Pro at 2 qt / ac at 23 % (Table 1). All other treatments had percent bareground above 70 % 35 DAT.

77 DAT

Statistical differences between treatments became more defined at this observation. Treatments that included imazapyr (Arsenal or Sahara) had bareground percentages above 95 %. The Casoron / Diuron 80DF tank mix provided 77 % bareground 77 DAT, a drop from the 90 % 35 DAT. All Payload / Milestone treatments resulted in unacceptable levels of percent bareground at this interval.

111 DAT

Treatments that included imazapyr (Arsenal or Sahara) again provided the highest levels of bareground at this interval. Sahara at 12 lb / ac resulted in 96 % bareground which was statistically similar to the 91 % seen in the Arsenal / Diuron 80DF tank mix. The Casoron / Diuron tank mix resulted in significantly lower bareground levels (73 %) than the imazapyr combinations at 111 DAT; however, the treatment did provide significantly higher levels of bareground than any Payload or Milestone treatment tested.

Overall

There was no significant difference between the Arsenal + Diuron80DF treatment and the Sahara treatment at any evaluation interval across the entire trial. The Arsenal / Diuron 80DF treatment did provide significantly higher control levels than the Casoron / Diuron 80DF treatment 77 and 111 DAT, indicating the effectiveness of imazapyr as a residual herbicide tank mix partner. The Payload / Milestone treatments tested never presented themselves as effective total vegetation control options. The Milestone alone treatment did provide significantly higher levels of bareground at 111 DAT than the Payload alone treatment, although both levels are considered operationally unacceptable as stand alone treatments. This result, however, does show potential benefit of using Milestone as a postemergent tank mix partner for applications made after the ideal application window for bareground applications (i.e. March-April).

Vegetation Summary

The following discussion will focus on vegetation 77 and 111 DAT. It must be stressed that the values presented here are averages and not analyzed statistically. The most common species living 111 DAT were annual lespedeza, yellow foxtail, and crabgrass. Species such as chicory, tall fescue, and dandelion were present; however, their frequency and distribution were too sporadic to effectively summarize.

The Payload alone treatment was ineffective in controlling annual lespedeza, which increased from 37 % cover 77 DAT to 63 % cover 111 DAT (Table 2). Yellow foxtail was present in all treatments at 77 DAT except those that included imazapyr. Frequency of yellow foxtail decreased through 111 DAT in all treatments. Crabgrass was not present 77 DAT; however, at 111 DAT crabgrass began occurring in most plots except those containing imazapyr.

Table 1: Summary Statistics for Non-typical Bareground Trial

Pest Name Rating Date Rating Data Type Rating Unit Days After First/Last Applic. Trt-Eval Interval ARM Action Codes				Bareground 19/May/2006 AREA % 0 0 0 DA-A 	Bareground 23/Jun/2006 AREA % 35 35 35 DA-A TA[5]	Bareground 4/Aug/2006 AREA % 77 77 77 DA-A 	Bareground 7/Sep/2006 AREA % 111 111 111 DA-A
Trt No.	Type	Treatment Name	Rate	Rate Unit			
			Rate	Unit	1	2	3	4
1	HERB HERB ADJ	Payload Roundup Pro NIS	12 2 0.25	OZ/A QT/A % V/V	10 a	45 cd	5 d	1 d
2	HERB HERB HERB ADJ	Payload Milestone VM Roundup Pro NIS	12 4 2 0.25	OZ/A FL OZ/A QT/A % V/V	5 a	75 bc	11 d	10 cd
3	HERB HERB HERB ADJ	Payload Milestone VM Roundup Pro NIS	8 4 2 0.25	OZ/A FL OZ/A QT/A % V/V	14 a	90 ab	30 c	22 c
4	HERB HERB ADJ	Milestone VM Roundup Pro NIS	4 2 0.25	FL OZ/A QT/A % V/V	5 a	75 bc	10 d	11 cd
5	HERB HERB ADJ	Milestone VM Roundup Pro NIS	7 2 0.25	FL OZ/A QT/A % V/V	11 a	75 bc	14 d	22 c
6	HERB HERB HERB ADJ	Arsenal 2 Diuron 80 DF Roundup Pro NIS	15 119.5 2 0.25	OZ A/A OZ A/A QT/A % V/V	11 a	98 a	97 a	91 ab
7	HERB HERB ADJ	Sahara Roundup Pro NIS	12 2 0.25	LB/A QT/A % V/V	9 a	96 ab	96 a	96 a
8	HERB HERB HERB	Casoron Diuron 80 DF Roundup Pro	3 8 2	LB/A LB/A QT/A	5 a	90 ab	77 b	73 b
9	CHK	Untreated Check			11 a	17 d	8 d	3 d
LSD (P=.05)					12.0	21.0t	16.4	18.1
Standard Deviation					6.9	12.1t	9.5	10.4
CV					77.21	19.99	24.63	28.66
Grand Mean					8.98	60.77t	38.54	36.43
Bartlett's X2					3.46	10.747	10.103	9.145
P(Bartlett's X2)					0.839	0.057	0.183	0.166
Replicate F					1.781	0.061	1.137	0.788
Replicate Prob(F)					0.2002	0.9412	0.3452	0.4718
Treatment F					0.663	6.708	51.817	41.166
Treatment Prob(F)					0.7165	0.0006	0.0001	0.0001
Means followed by same letter do not significantly differ (P=.05, LSD)								
t=Mean descriptions are reported in transformed data units, and are not de-transformed.								
Column 2: TA[5] = Arcsine square root percent([5])								

Table 2: Average Percent Cover for Three Most Common Species*

| Treatment	Annual Lespedeza		Yellow Foxtail		Crabgrass
	77 DAT	111 DAT	77 DAT	111 DAT	111 DAT
Payload @ 12 oz	37	63	24	10	0
Payload @ 12 oz + Milestone @ 4 fl oz	0	0	44	3	24
Payload @ 8 oz + Milestone @ 4 fl oz	7	0	21	10	24
Milestone @ 4 fl oz	0	7	46	7	12
Milestone @ 7 fl oz	0	0	40	24	38
Arsenal @ 60 fl oz + Diuron @ 9.3 lb / ac	0	0	0	0	0
Sahara @ 12 lb / ac	0	0	0	0	0
Casoron @ 3 lb / ac + Diuron @ 8 lb / ac	0	0	7	3	7
RoundUp Pro @ 2 qt / ac	43	58	3	1	0

*This data is not statistically analyzed and is for comparison purposes only.
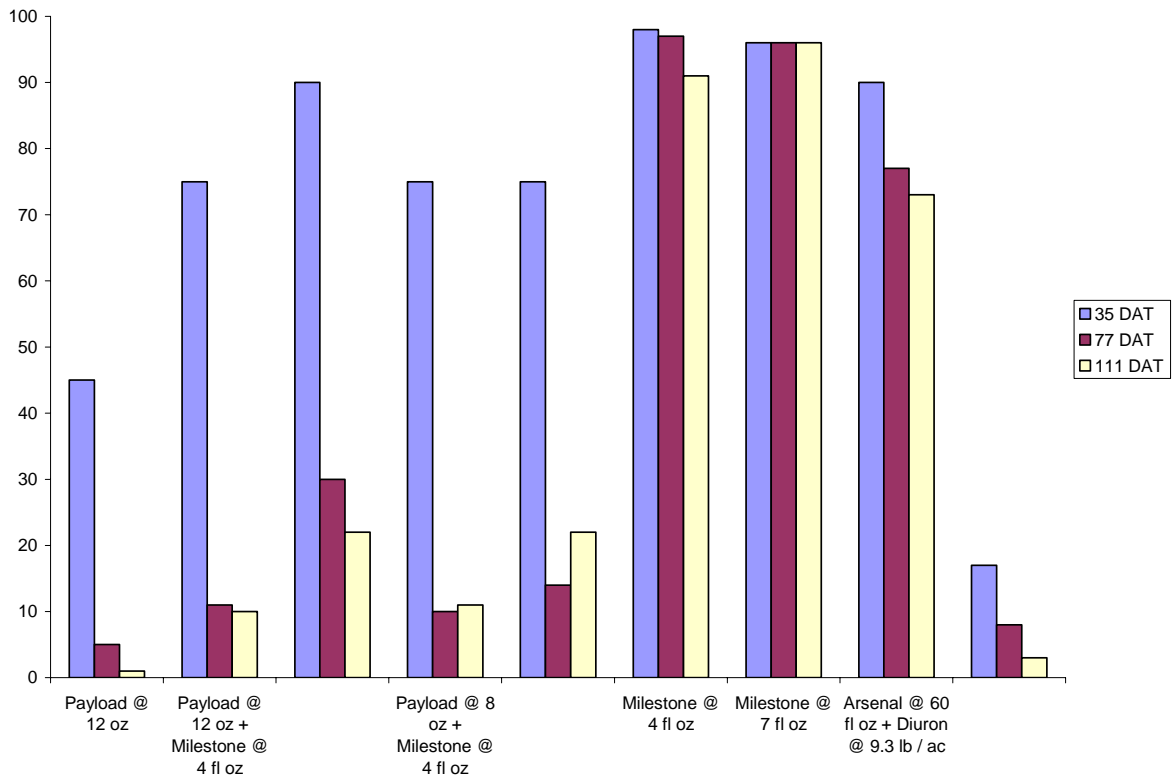
Figure 1: Mean Percent Bareground