

Combinations of Diuron, Flumioxazin, Glyphosate, and Sulfentrazone for Total Vegetation Control

Introduction

Industrial vegetation managers often require that certain areas remain free of vegetation. Areas may include roadside shoulders and guardrails, power substations, and pipeline yards. The reasons for vegetation free areas range from safety concerns to maintenance issues. Herbicides traditionally used for these types of applications are typically preemergent type herbicides; with little to no post activity; however some may have effective amounts of post activity. There are concerns that the products used, such as sulfometuron or diuron, may cause off target damage through lateral movement or desirable species uptake. These herbicides are usually applied at high per acre rates as well. Existing chemistries, such as imazapic, can be applied at lower per acre rates. Imazapic, an ALS inhibitor herbicide, has soil residual activity, little to no movement in the soil, and little to no activity on woody plants, all of which are desirable characteristics for a 'bareground' herbicide. A study was initiated in May of 2005 to evaluate Journey, a formulated blend of imazapic and glyphosate, for its ability to provide broad spectrum control of vegetation in bareground situations.

Methods and Materials

The study was installed on May 10, 2005 at the retired KTC storage lot at Ironworks Pike and I – 75 in Lexington, KY. Eleven chemical treatments and one untreated check were replicated three times in 5' X 20' plots arranged in a randomized complete block design (Table 1). Predominant vegetation included plantain, white clover, common ragweed, and tall fescue. Treatments were applied using a hand-held CO₂ sprayer at 20 GPA and included a nonionic surfactant at 0.25 % v/v. All plots were treated with 1.25 % v/v solution (equivalent to 32 fl oz / ac) of RoundUp Pro one hour after application to provide burndown of initial weed pressure. Plots were evaluated before application to obtain percent cover by species and percent bareground. Plots were then evaluated at 60, 90, and 120 DAT for the same information. Data was analyzed using analysis of covariance, with preapplication values as the covariate, due to the presence of a statistical difference in percent bareground values at initiation. Treatment means were compared using Tukey-Kramer's Test at $p = 0.05$.

Results

The Payload alone treatment and the Authority alone treatment were not as operationally and statistically effective as those that included Journey, Oust, and Karmex (Table 2). These two treatments never reached bareground levels greater than 85 % and dropped to unacceptable control levels at the end of the trial (120 DAT). All other herbicide treatments maintained high levels of control (> 90 %) at the end of the trial. This indicates the benefit of adding imazapic to Payload or Authority to obtain operationally successful control levels. Although there were no statistically significant differences between the Authority alone, Payload alone, and Journey + Authority

treatments at 120 DAT, the Authority alone and Payload alone treatments were significantly lower than all other herbicide treatments at 120 DAT.

The Karmex alone and Oust alone treatments were the only stand alone tested that produce excellent control levels through the entire study. The addition of Journey to Karmex did allow for the high levels of control to be consistently maintained through the trial; however, the two treatments were not statistically different at any time. Journey tank mixes with Karmex and Payload resulted in excellent control levels (> 95 %) at 120 DAT.

Table 1: Treatment list for Journey Bareground Trial

Treatment	Product	Active Ingredient(s)	Rate per acre
1	Untreated		
2	Authority	Sulfentrazone	8 oz
3	Payload	Flumioxazin	10 oz
4	Karmex 80WP	Diuron	8 lb
6	Oust	Sulfometuron	3 oz
7	Journey + Authority	Imazapic + glyphosate + sulfentrazone	32 fl oz + 8 oz
8	Journey + Payload	Imazapic + glyphosate + flumioxazin	32 fl oz + 10 oz
9	Journey + Karmex 80WP	Imazapic + glyphosate + diuron	32 fl oz + 8 lb

Table 2: Least Square Means of Percent Bareground for Journey Trial

Treatment	Product	60 DAT	HSD _{0.05} = 12.66	90 DAT	HSD _{0.05} = 23.75	120 DAT	HSD _{0.05} = 34.04
1	Untreated	59.46	c	50.92	c	43.74	c
2	Authority	82.45	b	73.71	bc	57.83	bc
3	Payload	82.81	b	80.27	ab	50.31	c
4	Karmex 80WP	97.31	a	95.3	ab	94.55	a
6	Oust	96.95	a	98.42	a	96.24	a
7	Journey + Authority	94.81	ab	91.66	ab	90.87	ab
8	Journey + Payload	95.49	a	94.18	ab	96.12	a
9	Journey + Karmex 80WP	97.66	a	97.23	ab	97.87	a

Note: Treatment means followed by the same letter are not statistically different at the given time interval using Tukey's HSD at p = 0.05.

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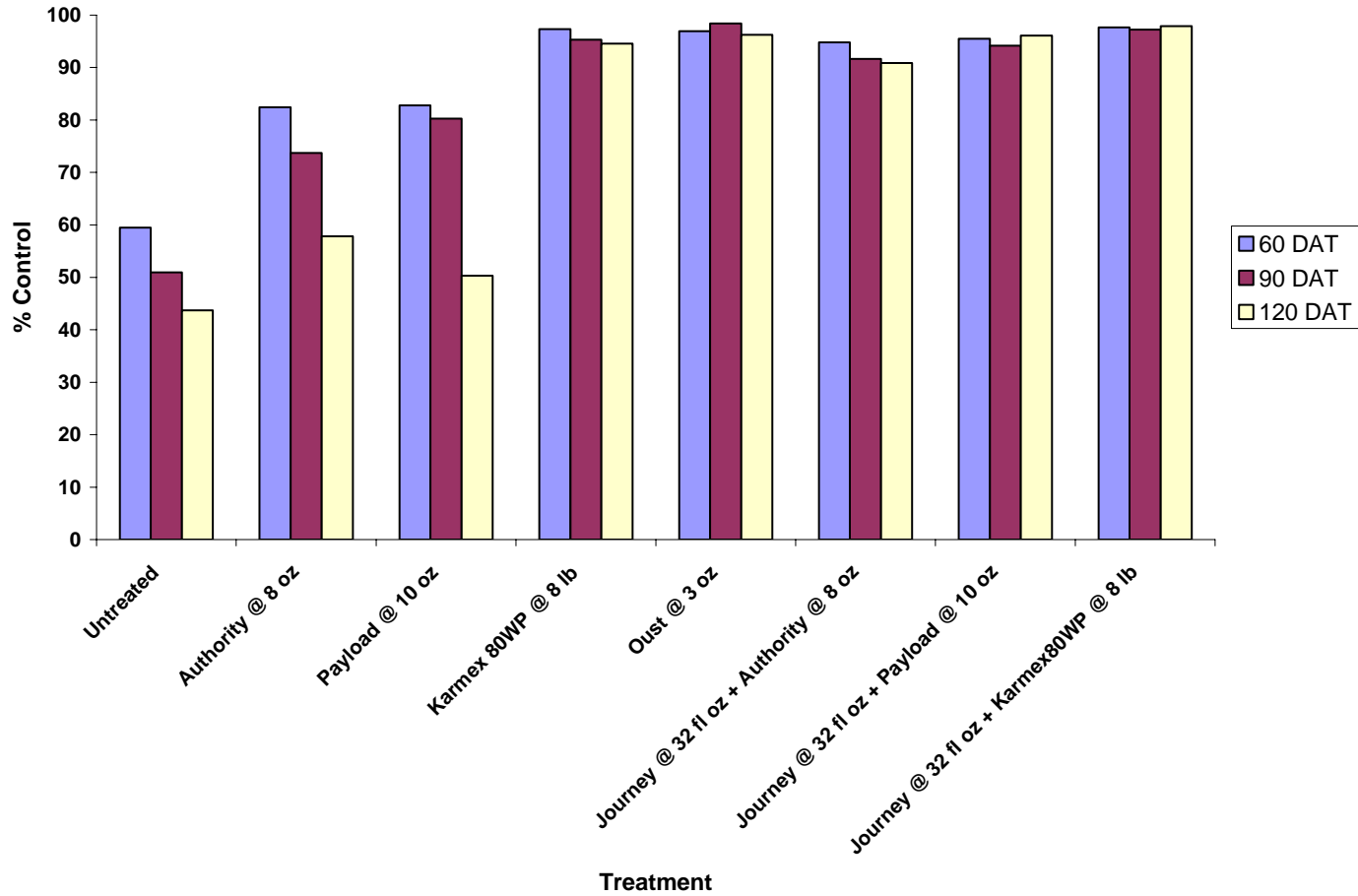


Figure 1: Treatment Mean Comparisons of Percent Bareground