

EFFICACY OF TREATMENTS USING MAT-28 FOR PINE SITE PREPARATION

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ABSTRACT

Site preparation for pine plantation establishment continues to be the principal use of herbicides in the South. Due to the timing of the work and the cost involved, these applications are critical in both biological and economic terms. In an effort to improve performance in both considerations, a study was undertaken to evaluate a number of herbicide compounds in site preparation applications. A total of 12 treatments were applied with three replications on three sites in a randomized complete block design. Applications were completed in mid-July using a total spray volume of 15 gpa. Treatments included MAT-28 applied alone at three rates and MAT-28 applied in combination with metsulfuron, imazapyr, glyphosate, or sulfometuron. An assessment of hardwood control was evaluated at one year after treatment. Results from all evaluations indicated that MAT-28 applied alone did not control the principal species on these study sites very well. Mixtures with imazapyr and glyphosate provided excellent control of hardwoods.

INTRODUCTION

The use of herbicides continues to be the primary way forestry site preparation is conducted in the South. While more than twenty products are registered for such applications, the majority of acres are treated with three to four active ingredients applied alone or in some combination of two or more products. The cost-efficacy of these treatments is very favorable and the primary reason that so few active ingredients are used is because we are able to obtain high levels of control for comparatively low expense per acre. Such a situation is inhibitive to the introduction of new products into this market. For that reason, very few new herbicide compounds are tested for such use.

Aminocyclopyrachlor is a relatively new herbicide which may have potential for use in forestry site preparation. The current formulation (MAT-28) has demonstrated promise for site preparation in terms of both control of some undesirable species and crop tolerance. The objective of the current study was to evaluate the efficacy of site preparation mixtures which contained aminocyclopyrachlor which has not been previously tested.

MATERIALS AND METHODS

STUDY SITES

The study was installed on three sites. Full description and results will be provided in this paper for two of the sites. In Mississippi, the study was installed on Weyerhaeuser land near Longview, MS. Soil on the area was a Falkner silt loam with a pH=5.4. The area had been harvested in August, 2008 and no site preparation had been conducted. In Texas, the study was installed on Weyerhaeuser land near St. Augustine, TX. The soil was a sandy loam with a pH=5.2. The site was a former plantation which was harvested in August, 2008.

TREATMENTS

A complete list of treatments is found in Table 1. There were three replications of the 12 treatments applied in a randomized complete block design.

APPLICATION

All plots were rectangular areas 30'x100'. A piece of rebar was set at the center of each end of a plot and a string was stretched down the midline of the plot between the rebar. Treatments were applied using a CO₂-powered backpack sprayer with pole extension and a KLC-9 tip which simulated aerial application. Total spray volume was 15 gpa. All treatments were applied July 15, 2009.

EVALUATIONS

Evaluations were completed on a sample area of 10'x80' which was centered in the treatment plot. Prior to treatment, all woody stems in the sample area were recorded by species and height class. In October, 2010 (15 months after treatment), living stems of woody plants were tallied by species and height class.

DATA ANALYSIS

Cumulative heights were derived by multiplying the number of stems by their respective heights for each species. Percent changes were calculated for the principal species on each

site and for the total species on each site. Percent values were subjected to arcsine transformation, but actual values are presented herein. Means separation was completed using Duncan's New Multiple Range Test at $\alpha=0.05$.

RESULTS

The principal species on the Mississippi site were sweetgum, red oaks (southern red, water and cherrybark), persimmon, and winged elms (Table 2). The winged elm was not present in sufficient numbers for statistical evaluation of all treatments, but nine of the twelve treatments included sufficient numbers for comparison. MAT-28 applied alone does not control sweetgum or red oaks well. This had been observed in earlier studies and results of this study were consistent with the earlier findings. MAT-28 applied alone or with small amounts of imazapyr provided good to excellent control of persimmon. Control of winged elm was variable, but good control was observed in the lowest rate of MAT-28 applied alone. Control of the total stems on the site was strongly influenced by the results of the sweetgum response since that species was present in greater numbers than any other species (Table 2).

Control in Texas was better than in Mississippi with most treatments resulting in some reduction of cumulative

heights. Control of both sweetgum and the oaks in Texas was variable and would generally be considered unacceptable for site preparation (Table 3). Even the mixes of Oust Extra, Chopper Gen2, and glyphosate commonly used for site preparations (Treatments 10 and 11) failed to provide good control on the Texas site. However, these two treatments provided very good (Treatment 10) to total (Treatment 11) control on the Mississippi site.

SUMMARY

Generally, MAT-28 applied alone in this study did not provide good control of hardwoods. Exact results varied by state, but the trends were similar. The control of winged elm is promising, but more research is needed to confirm that finding. Combining MAT-28 with Chopper GEN2 could prove to be an effective treatment, but that combination was purposefully omitted to facilitate crop tolerance testing later in these studies.

It appears evident that MAT-28 will not be a stand-alone treatment for forestry site preparation. Currently labeled products in the utility and rights-of-way markets use MAT-28 in mixes with other herbicides. The herbicide does have potential for use as a tank mix partner in forestry site preparation work.

Table 1—List of treatments applied in 2009 MAT-28 study

Treatment No.	Herbicide and Rate/Acre
1	MAT-28 (3.76 oz) + MSO 1% v/v
2	MAT-28 (5.64 oz) + MSO 1% v/v
3	MAT-28 (7.62 oz) + MSO 1% v/v
4	MAT-28 (3.76 oz) + Escort (1.0 oz) + Imi* (3.5 oz) + MSO 1% v/v
5	MAT-28 (5.64 oz) + Escort (1.5 oz) + Imi (5.2 oz) + MSO 1% v/v
6	MAT-28 (7.62 oz) + Escort (2.0 oz) + Imi (7.0 oz) + MSO 1% v/v
7	MAT-28 (3.76 oz) + Oust Extra (2.0 oz) + Gly (5 qts) + MSO 1% v/v
8	MAT-28 (5.64 oz) + Oust Extra (3.0 oz) + Gly (5 qts) + MSO 1% v/v
9	MAT-28 (7.52 oz) + Oust Extra (4.0 oz) + Gly (5 qts) + MSO 1% v/v
10	Oust Extra (4.0 oz) + GEN2** (32 oz) + Gly*** (5 qts) + MSO 1% v/v
11	Oust Extra (4.0 oz) + GEN2 (40 oz) + Gly (2 qts) + MSO 1% v/v
12	Untreated check
*75% WG formulation of Imazapyr	
**Chopper GEN2	
***Glyphosate (4 lbs. a.i./gallon)	

Table 2—Percent change in cumulative heights for principal species and total hardwoods by treatment in 2009 aminocyclopyrachlor study (MS)

Treatment	Species ¹				Total ²
	SWG	REO	PER	WIE	
	----- percent -----				
1	+458f ^{3 4}	+171d	23e	84.66	+351g
2	+160e	+450g	100.0a	+67d	+237f
3	+548f	+360f	66.7b	*	+285f
4	25.2c	+307f	25.0c	+33cd	+80e
5	+59c	11.5c	92.9a	25.0c	+26d
6	129	+164d	100.0a	+100.0a	+110e
7	37.7c	88.9b	100.0a	100.0a	54.5bc
8	52.2bc	+266e	+81d	*	24.1c
9	+24d	N.C.	66.7b	*	2.2cd
10	76.5b	79.2b	55.6b	100.0a	79.2b
11	100.0a	100.0a	100.0a	100.0a	100.0a
12	+140e	+266e	+4cd	+28e	+96e

¹ SWG = sweetgum, REO = red oaks, PER = persimmon, WIE = winged elm

² Total = all hardwood species (results strongly influenced by sweetgum response)

³ Plus sign indicates an increase in cumulative heights

⁴ Values in a column followed by the same letter do not differ at alpha = 0.05

* Insufficient stems for comparison

Table 3-Percent change in cumulative heights by treatment for hardwoods in 2009 aminocyclopyrachlor study (TX)

Treatment No.	Oak	SWG	Total
	----- percent -----		
1	11ab ²	34b	+11c ³
2	+5b	5ab	+1bc
3	+10b	+53c	+14c
4	26ab	1abc	17abc
5	8ab	24a	20abc
6	56a	27a	43a
7	17ab	52a	39a
8	43ab	29a	25ab
9	33ab	28a	44a
10	33ab	59a	46a
11	62	61a	42a
12	+83c	+48bc	+54d

¹ SWG = sweetgum, Total = all hardwood species

² Values in a column followed by the same letter do not differ at alpha = 0.05

³ Plus sign indicates an increase in heights