

ADDITION OF SULFOMETURON METHYL TO FALL SITE PREPARATION TANK MIXES IMPROVES HERBACEOUS WEED CONTROL

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Abstract— A total of 12 herbicide treatments were applied to a recently harvested forest site in Winston County, MS. All treatments were representative of forest site preparation tank mixtures and were applied early September, 1999. Three ounces of Oust⁷ were included in two of the tank mixes, and 19 ounces of Oustar⁷ were included in two of the mixes. All treatments were applied with a CO₂-powered backpack sprayer to simulate aerial application at 10 gpa. In May, June, July, and August of 2000, treatment plots were evaluated for herbaceous competition control. During October, 2000, plots were evaluated for woody stem control based on a comparison with pre-treatment measurements. In May 2000, herbaceous species had reduced the average percent clear ground to 42-62 percent in plots without Oust or Oustar while those plots with the products added had 94-97 percent clear ground. Untreated areas had only one percent clear ground by this rating time. Percent clear ground continued to decrease to 10-15 percent in July for plots without Oust or Oustar while plots were 83-94 percent clear in treatments with the product. By August, plots with the Oust were 65-80 percent clear and those with Oustar were 57-92 percent clear whereas plots without the products were 5-13 percent clear. Both Oust and Oustar provided excellent herbaceous weed control for 12 months following application in this study. Oustar provided slightly better control than the Oust.

INTRODUCTION

In establishing a new stand of trees, the competition from herbaceous weeds is a significant factor in the initial survival and growth of planted seedlings. The current conventional approach to this problem is to apply a release treatment over the top of the planted seedlings in either a broadcast or banded pattern. While this competition problem is most often addressed in pine management, it is a noteworthy in hardwood plantation establishment, also. Interest has been expressed in the potential for a site preparation treatment which would also provide first year herbaceous competition control for pine seedlings.

OBJECTIVES

The objectives for this study were as follows:

- 1) To evaluate the efficacy of Oust and Oustar for herbaceous weed control the year following site preapplication.
- 2) To evaluate various tank mixtures for control of competing woody vegetation during site preparation

METHODS

The study was installed in Winston County, MS on land owned by The Timber Company. The previous stand had been mixed pine-hardwood and had been harvested in October, 1998. The soil was a clay loam with a pH = 5.6. A total of 12 herbicide treatments were applied on September 8, 1999. A complete list of the treatments is found in table 1.

Herbicide treatments were applied to with a CO₂-powered backpack sprayer with a total spray volume of 10 gpa. Each treatment and an untreated check were replicated three times in a completely randomized design.

Prior to treatment, a woody stem count was completed on each plot, and stems were recorded by species and height class. An ocular estimate of brownout was completed at 6WAT, and plots were assessed in October 2000 for any living woody stems. During May, June, July, and August, herbaceous cover was estimated ocularly in the plots. All data were subjected to ANOVA and specific tests to separate means.

RESULTS

The results of herbaceous competition control evaluations can be found in tables 2, 3, and 4. When compared to untreated areas, the herbicide treatments all exhibited control on herbaceous weeds. However, by July, those treatments without Oust or Oustar generally had 15 percent or less clear ground while those with Oust or Oustar generally had more than 80 percent clear ground (table 2). The addition of either Oust or Oustar provided excellent herbaceous weed control throughout the growing season.

Percent grass cover was relatively low on the area with scattered *Panicum* spp., *Carex* spp., and *Andropogon* accounting for the vast majority of this type vegetation. Only the *Andropogon* invaded the plots with Oust or Oustar (table 3). Overall, grass/sedge was not a major competitor on this site.

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Broadleaf weeds were a major source of competition on this site. The site preparation mixes without Oust/Oustar did not differ from the untreated check in percent broadleaf coverage (table 4). The treatments with Oust or Oustar did an excellent job of controlling the broadleaves on this site until August which was 11 months after application. Even then, control was still good with generally less than 33 percent of the plot covered by broadleaves, although one replication in Treatment 11 did have higher infestation. The principal species on the site were fireweed (*Erechtites hieracifolia*), woolly croton (*Croton capitatus* var. *capitatus*), common ragweed (*Ambrosia artemisiifolia*), and common pokeweed (*Phytolacca americana*). The woolly croton was not a problem until late in the growing season and accounts for much of the increased coverage in Oust/Oustar plots in August (table 4).

A wide variety of woody species occurred on this site, but the majority of stems were either sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), or persimmon (*Diospyros virginiana*). There was no significant difference among any of the treatments in the control of sweetgum or persimmon, and only one treatment varied significantly in the control of red maple (table 5). Overall control of woody species was excellent as noted by the "Total" column in table 5. This percent is for all stems of all species. The more common of the "less frequent" species included loblolly pine (*Pinus taeda*), winged elm (*Ulmus alata*), water oak (*Quercus nigra*), cherrybark oak (*Q. pagoda*), willow oak (*Q. phellos*), post oak (*Q. stellata*) and southern red oak (*Q. falcata*). Control for these species can be found in table 6. As might be expected, these species all generally increased their number of stems per acre in the untreated plots (table 5 and 6).

SUMMARY

Overall, the site preparation treatments in this study did an excellent job. The treatment areas were generally free of woody competition can could be planted easily.

Table 1—List of treatments in 1999 Fall Oust/Oustar site preparation field trials –MS

Treatment No.	Herbicides Rates/A. ^a
1	6 QTS KRENITE + 20 OZ CHOPPER + 1 QT TL90
2	4 QTS KRENITE + 20 OZ CHOPPER + 1 QT TL90
3	4 QTS KRENITE + 20 OZ CHOPPER + 1 QT TL90
4	4 QTS KRENITE + 16 OZ CHOPPER + 1 OZ ESCORT 1 QT TL90
5	4 QTS KRENITE + 20 OZ CHOPPER + 1 QT ACCORD SP + 1 QT TL90
6	5 QTS ACCORD SP + 16 OZ CHOPPER
7	1 QT ACCORD SP + 48 OZ CHOPPER + 1 QT TL90
8	1 QT ACCORD SP + 1 OZ ESCORT + 24 OZ CHOPER + 1 QT TL90
9	TMT #6 WITH 3 OZ OUST
10	TMT #7 WITH 3 OZ OUST
11	TMT #6 WITH 19 OZ OUSTAR
12	TMT #7 WITH 19 OZ OUSTAR
13	UNTREATED

^a all rates are expressed as actual product.

The addition of Oust or Oustar to the treatments provided excellent herbaceous weed control for the entire growing season following application. Oustar did provide slightly better control than Oust, but this could be due to the species involved. Land managers now have an option for first year herbaceous competition control which could avoid release operations.

Table 2— Average percent clear ground in 1999 Fall Oust/Oustar site prep field trials-MS

Treatment No.	Time of Evaluation			
	May	June	July	August
	-----Percent-----			
1	53b ^a	37b	10b	7c
2	42b	32b	13b	10c
3	62b	37b	18b	13c
4	42b	30b	13b	7c
5	53b	40b	15b	8c
6	47b	30b	10b	5c
7	43b	28b	10b	7c
8	58b	40b	13b	7c
9 ^b	95a	91a	87a	80a
10 ^b	97a	95a	93a	65b
11 ^c	94a	90a	83a	57b
12 ^c	96a	94a	94a	92a
13	2c	1c	0c	0c

^a Values in column followed by the same letter do not differ at P = 0.05

^b Treatments with 3 ounces Oust/A

^c Treatments with 19 ounces Oustar/A

Table 3-- Average percent grass cover in 1999 Fall Oust/Oustar field trials-MS

Treatment No.	Time of Evaluation			
	May	June	July	August
	-----Percent-----			
1	2	2	5	7
2	2	2	3	5
3	2	2	4	5
	4	2	2	3
5				
5	2	2	4	7
6	2	2	4	7
7	2	4	6	7
8	2	3	5	7
9 ^a	0	0	0	1
10 ^b	0	0	0	1
11 ^b	0	0	0	1
12 ^b	0	1	1	2
13	6	7	12	18

^a Treatments with 3 ounces Oust/A

^b Treatments with 19 ounces Oustar/A

Table 4-- Average percent bradleaf cover in 1999 Fall Oust/Oustar field trials-MS

Treatment No.	Time of Evaluation			
	May	June	July	August
	-----Percent-----			
1	37b ^a	53b	67b	85b
2	50b	62b	68b	83b
3	43b	58b	67b	80b
4	53b	67b	70b	87b
5	43b	58b	67b	83b
6	53b	67b	75b	87b
7	57b	68b	78b	90b
8	40b	57b	67b	80b
9 ^b	1a	2a	5a	20a
10 ^b	1a	2a	2a	33ab
11 ^c	2a	3a	6a	40ab
12 ^c	1a	1a	2a	7a
13	50b	53b	53b	67b

^a. Values in column followed by the same letter do not differ at P = 0.05

Table 6—Average percent stem reduction in “other” species found in 1999 Fall Oust field trials–MS

Trt. No.				Species ^a			
	LLP	WAD	WIE	CBO	WIO	POO	SRO
	-----Percent-----						
1	-100 ^b	-100	+30	*	*	*	*
2	-100	-100	+85	-100	-100	-100	*
3	-100	-100	-46	-100	-100	-100	-100
4	* ^c	-100	-100	*	*	*	*
5	*	*	nc ^d	-85	*	-100	*
6	-100	*	-30	-100	-100	-100	-100
7	-23	*	-77	-100	*	*	-100
8	-58	-100	-100	-100	-100	-100	-100
9	-88	+100	-100	-100	-100	-100	-100
10	-10	-100	*	-100	-100	-100	-100
11	+33	+30	-89	-70	*	-57	*
12	-57	nc	-37	-100	-100	-100	-100
13	*	+700	+143	+30	nc	+31	+233

^a LLP = loblolly pine, WAO = water oak, WIE = winged elm, CBO = cherrybark oak, WIO = willow oak, POO = post oak, SRO = southern red oak

^b Negative values indicate reduction in number of stems

^c Insufficient stems for evaluation

Table 5— Average percent stem reduction of principal species in 1999 Fall Oust field trials-MS

Treatment No.	Herbicides ^a	Species ^{b,c}			
		SWG	REM	PER	Total
		-----Percent-----			
1	Krenite + Chopper (6+20)	100a	-100a	-100a	-85ab
2	Krenite + Chopper (4+20)	-100a	-100a	-85ab	-90a
3	Krenite + Chopper (4+24)	-100a	-100a	-100a	-98a
4	Krenite + Chopper + Escort (4+16+1)	-100a	-100a	-100a	-94a
5	Krenite + Chopper + Accord SP (4+20+1)	-100a	-100a	-100a	-95a
6	Accord SP + Chopper (5+16)	-100a	-100a	-100a	-93a
7	Accord SP + Escort + Chopper (1+48)	-100a	-100a	-100a	-88a
8	Accord SP + Escort + Chopper (1+1+24)	-100a	-100a	-100a	-93a
9	Trt. #6 + 3 oz Oust/A	-89a	-100a	-100a	-93a
10	Trt. #7 + 19 oz Oust/A	-100a	-100a	-100a	-90a
11	Trt. #6 + 3 oz Oustar/A	-100a	-80b	-100a	-68b
12	Trt #7 + 19 oz Oustar/A	-100a	-100a	-100a	-94a
13	Untreated	+23b	+260c	+67c	+51

^a Krenite and Accord SP = quarts/A., Chopper and Escort = ounces/A.

^b SWG = sweetgum, REM = red maple, PER = persimmon

^c Values followed by the same letter in a column do not differ at P = 0.05