WEED CONTROL AND SEEDLING GROWTH USING PRE-EMERGENCE OUST, VELPAR OR VELPAR+OUST IMPREGNATED DAP. D.A. Knox and J. L. Yeiser. Arthur Temple College of Forestry, Stephen F. Austin State University, Nacogdoches, TX 75962.

ABSTRACT

Currently managers apply herbicide and fertilizer over the top of newly planted loblolly pine seedlings in two separate passes and incurring two application costs. A technology that accomplishes both weeding and feeding in one pass will reduce cost and save time. The objective of this study is to compare the efficacy and subsequent seedling growth of pre-emergence applications of (1) conventional liquid herbicide treatments, (2) fertilizer and herbicide treatments applied in two separate passes (current technology) and (3) DAP impregnated with herbicide and applied with one pass (weed and feed technology).

Three sites were tested. The Diboll, TX site was clearcut in September 1998, chemically prepared in September 1999 with Arsenal+Garlon 4 (16oz+2qt), mechanically mulched and subsoiled in October, and planted in February 2000. In Picayune, MS, the site was clearcut in December 1998, shear and raked in October, double bedded in November of 1999, and planted in January 2000. The Whitfield, AL site was clearcut in August and burned in December, both in 1998. In 1999, the site was prepared in July with a Chopper+Escort+Accord (40oz+1oz+1qt) herbicide treatment, subsoiled in December, and planted in January 2000. Ten treatments were tested in TX and twelve treatments in MS and AL. Treatments were: (1) Velpar+Oust (1qt+2oz) applied as a liquid spray, (2) V+O impregnated on DAP (1qt+2oz+125 lb) applied as a granule, (3) Velpar impregnated on DAP (1qt+125 lb) applied as a granule, (4) Velpar impregnated on DAP (1qt+250 lb) applied as a granule (not TX), (5) Oust (2oz) applied as a liquid spray, (6) Oust as a liquid spray followed by DAP applied as a granule (2oz & 125 lb), (7) Oust as a liquid spray followed by DAP applied as a granule (2oz & 250 lb) (not TX), (8) Oust impregnated on DAP (2oz+125 lb) applied as a granule, (9) Oust impregnated on DAP (2oz+250 lb) applied as a granule, (10) Oust impregnated on DAP (4 oz+125 lb) applied as a granule, (11) DAP (125 lb) applied as a granule (no herbicide) and (12) Untreated Check. All sites were subject to a July through October 2000 drought.

At all three sites, significantly more weed control was observed on herbicide treated plots than untreated check and DAP only plots. In TX and MS, overall weed control for evaluations 60 days after treatment (DAT) exceeded 90%; control 120 DAT exceeded 80%. In AL, overall weed control 60 DAT exceeded 80% and declined to 70% 120 DAT. At all three sites, all two-pass treatments (Oust (2 oz) followed by 125 or 250 lb DAP), conventional sprays of Velpar+Oust, and treatments of DAP impregnated with Oust (4 oz) or Velpar+Oust provided similar and best weed control. In TX and MS, Oust (2oz) was among treatments providing best weed control. In MS, Velpar impregnated on 250 lb of DAP was among treatments providing best weed control. Velpar impregnated on 125 lb of DAP provided least consistent weed control. Seedlings at the MS site were not measured at the time this report was prepared. In TX, all treatments containing a herbicide exhibited significantly greater seedling survival (88%) than check (73%) or DAP only (46%) treatments. No differences in survival were recorded in AL (65%). In TX and AL, seedlings growing in herbicide treated plots were taller and had more volume than seedlings in check and DAP only plots. Growth differences among fertilized and unfertilized plots were not detected. Drought negatively impacted survival and growth at all three sites.

EARLY SEASON APPLICATIONS OF OUSTAR FOR HERBACEOUS WEED CONTROL IN LOBLOLLY PINE PLANTATIONS. A.W. Ezell, Department of Forestry, Mississippi State University, Mississippi State, MS 39762 and J.L. Yeiser, Stephen F. Austin State University, Nacogdoches, TX 75962.

ABSTRACT

Herbaceous weed control is extremely important in the establishment of loblolly pine plantations and is widely practiced across the South. Oustar® is a product which has potential for use in such applications. During April, 2000, four rates of Oustar were applied in first year loblolly pine plantations in Mississippi and Texas. In addition, two tank mixtures which are considered industry standards were applied in the same locations for comparison. All six treatments were replicated three times in Mississippi and four times in Texas. Plots were evaluated at 30, 60, 90, and 120 DAT for control of herbaceous species and for any symptoms of crop damage. Fifteen sample trees were measured in each treatment plot prior to application and at the end of the first growing season. Total seedling height and groundline diameter (GLD) were the measurement parameters.

Survival did not vary significantly among the herbicide treatments or the untreated areas. This is believed to be attributed to adequate early growing season rainfall. In Texas, all treatments maintained more than 90% control of competition for 90 DAT and only one treatment had less than 90% clear ground at 120 DAT. In Mississippi, treatment plots remained more than 90% clear for 60 DAT, but percent clear ground had reduced to 78-90% at 90 DAT and 75-83% at 120 DAT. No significant differences existed among any treatments at either location at 120 DAT. Overall, the industry standards performed as well or slightly better than the Oustar treatments, but any difference were minor, and control by all treatments was considered to be excellent. In Texas, only the highest rate of Oustar had tree height which was significantly different, and while more differences in Mississippi existed, no

rate response was evident. No significant differences existed for groundline diameter (GLD) measurements in Texas, but all treatments resulted in significantly greater GLD than the untreated plots in Mississippi.

INTRODUCTION

Establishing pine plantations continues to be a major focus of forest management in the South. For years, forest land owners have recognized the importance of herbaceous weed control and such applications are part of most forest industry management plans. This control typically includes an application during the first growing season either as a banded or broadcast treatment. Control is hoped to last for 120 days after treatment (DAT) or longer. In an effort to examine new approaches to this management scenario, this study was installed at locations across the South.

Objectives

The objectives of the study were as follows:
1) To compare various rates of Oustar® to accepted industry standards for herbaceous weed control.
2) To evaluate the efficacy of all treatments on various weed complexes and further evaluate crop tolerance of Oustar applied over loblolly pine seedlings.

METHODS AND MATERIALS

A total of six herbicide treatments were applied in this study (Table 1). These included four rates of Oustar and two tank mixes which are considered to be industry standards. In addition, an untreated check was considered as a treatment in all plot installations. All treatments were installed with a randomized complete block design with a minimum of three replications per treatment.

Study sites were selected in both Mississippi and Texas. In Mississippi, the study was installed on land owned by The Timber Company which had been harvested in May 1999, chemically site prepared in August 1999, burned and planted with 1-0 bareroot loblolly pine seedlings in January 2000. The soil was a Ruston sandy clay loam with a pH=5.2. The study site in Texas was on land owned by Temple-Inland Corporation which was harvested in September 1998, site prepared in 1999 and planted with containerized loblolly pine seedlings in January 2000. The soil was a sandy clay loam with a pH=5.5

All treatments were applied on either April 10, 2000 (MS) or April 11, 2000 (TX). Each treatment plot was a five-foot spray swath (width) with each plot of a variable length required to ensure the presence of 15 measurement trees per plot. All treatments were applied with a $C0_2$-powered backpack sprayer with a total spray volume of 10 gpa.

Prior to application, the total height and groundline diameter of each measurement tree was recorded to facilitate growth comparisons. At 30, 60, 90, and 120 DAT, an ocular evaluation was completed on each plot to assess competition control and any symptoms of damage on the pine seedlings which could have occurred as a result of the herbicide treatments. At the end of the growing season, the trees were again measured for total height, groundline diameter, and survival. Data were subjected to ANOVA and specific tests for separation of means.

RESULTS

Survival in all treatment plots at both study locations was considered to be excellent (Table 2). None of the differences were statistically significant, and any differences (however minor) are believed to be attributable to individual seedling tolerance and/or microsite variation.

In competition control, all herbicide treatments remained more than 90% clear of herbaceous competition for 60 DAT in Mississippi (Table 3). The chemical site preparation exhibited some residual effect in that untreated plots remained more than 25% clear throughout the study in Mississippi and that is thought to have contributed to the excellent survival in untreated plots. By 120 DAT in Mississippi plots, clear ground had decreased to 75-83% in treatment plots with no statistical differences among the herbicide treatments. At the Texas site, all treatments remained more than 90% clear for 90 DAT, and only one (16 oz. Oustar) was less than 90% at 120 DAT. No statistical differences existed among treatments, with the exception of untreated plots which averaged only 17% clear ground by 120 DAT (Table 4).

Table 5 has the average total heights for seedlings after one growing season, and the tallest trees were in the Oust/Velpar tank mix at both locations. The average height in the Oust/Arsenal mix was equal to the other industry standard in Mississippi, but was appreciably less (though not significant) in Texas. In both locations, the highest rate of Oustar (19 oz./A) had some of the lower heights while the 16 oz. rate was statistically similar to the tank mix averages at both sites. Of note is the discrepancy between height growth in untreated plots between locations. Height growth was the lowest average overall in Mississippi, but ranked second in Texas. This is possibly an effect of having containerized seedlings in Texas.

The effect of containerized seedlings was quite possibly also evident in groundline diameter measurements (Table 6). All averages in Texas were very similar while the seedlings in untreated areas in Mississippi were only

approximately half the size of seedlings in all treatment plots except the 13 oz./A Oustar treatment. As there is no apparent rate response or other treatment effect in the data, this lower overall diameter in 13 oz. Oustar plots can only be attributable to seedling variation in the bareroot stock.

In summary, survival was exceptional in all plots in consideration of the extreme drought of 2000. All herbicide treatments provided excellent control for the entire study period, and the Oustar treatments provided comparable results to the "industry standard" tank mixes. A rate response was not evident in the Oustar applications although growth parameters were less in some of the Oustar - 19 oz./A plots. Average height varied by site and treatment, and average groundline diameter varied more in Mississippi than in Texas. However, seedlings in Mississippi had significantly greater groundline diameter in the treated plots which should be of note to managers planning to use 1-0, bareroot seedlings. Finally, none of the treatments caused any damage to any of the seedlings in this study.

Table 1. List of treatments utilized in 2000 Oustarfield trials.

Treatment No.	Herbicide and Rate[1]/Acre
1	10 oz. Oustar
2	13 Oz. Oustar
3	16 oz. Oustar
4	19 oz. Oustar
5	2 oz. Oust + 32 oz. Velpar L
6	2 oz. Oust + 4 oz. Arsenal AC
7	Untreated

[1] actual product

Table 2. Average survival in 2000 Oustar field trials (average all reps per site).

Treatment	Location	
	TX	MS
	----------percent--------	
10 oz. Oustar	100.0a	97.4a
13 oz. Oustar	97.9a	93.9a
16 oz. Oustar	97.9a	97.5a
19 oz. Oustar	93.7a	90.2a
Oust + Velpar (2 + 32)	93.7a	97.6a
Oust + Arsenal (2 + 4)	100.0a	100.0a
Untreated	93.7a	94.4a

Table 3. Average percent clear ground in 2000 Oustar field trials (no wood stem coverage included)- MS.

Treatment	Time of Observation			
	30DAT	60DAT	90DAT	120DAT
		----------percent----------		
10 oz. Oustar	96a[1]	93a	83ab	78a
13 oz. Oustar	98a	95a	78b	75ab
16 oz. Oustar	97a	96a	85a	81a
19 oz. Oustar	97a	96a	87a	78a
Oust + Velpar (2+32)	97a	96a	88a	81a
Oust + Arsenal (2+4)	97a	91a	90a	83a
Untreated	45b	32b	25c	28c

[1] means followed by the same letter in a column do not differ at P=0.05.

Table 4. Average percent clear ground in 2000 Oustar field trials (avg. all reps) - TX.

Treatment	Time of Observation (DAT)			
	30	60	90	120
	----------percent----------			
10 oz. Oustar	93a[1]	94a	90a	92a
13 oz. Oustar	98a	97a	96a	92a
16 oz. Oustar	98a	98a	96a	71a
19 oz. Oustar	99a	99a	99a	99a
Oust + Velpar (2+32)	98a	97a	97a	97a
Oust + Arsenal (2+4)	99a	99a	99a	96a
Untreated	27b	27b	27c	18b

[1] means followed by the same letter in a column do not differ at P=0.05.

Table 5. Average seedling height for pine seedlings in 2000 Oustar field trials.

Treatment	Study Site	
	TX	MS
	----------inches--------	
10 oz. Oustar	22.6bc	28.7ab
13 oz. Oustar	23.9abc	24.2bc
16 oz. Oustar	24.8ab	27.2abc
19 oz. Oustar	21.1c	26.8bc
Oust + Velpar (2+32)	26.0a	30.5a
Oust + Arsenal (2+4)	22.9abc	30.5a
Untreated	25.3ab	20.6c

Table 6. Average seedling groundline diameter of pine seedlings in 2000 Oustar field trials.

Treatment	Study Site	
	TX	MS
	----------inches--------	
10 oz. Oustar	0.60a	0.63a
13 oz. Oustar	0.64a	0.49b
16 oz. Oustar	0.66a	0.63a
19 oz. Oustar	0.60a	0.59ab
Oust + Velpar (2+32)	0.68a	0.56ab
Oust + Arsenal (2+4)	0.65a	0.69a
Untreated	0.64a	0.32c