

PINE TOLERANCE TO SEVERAL NEW HERBICIDES. J. L. Michael, George W. Andrews
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ABSTRACT

Four new chemicals and Velpar L^(R) were applied at several rates to loblolly pine (Pinus taeda L.) seedlings ranging in age from approximately 1 month to 3 years. Of the chemicals applied (Oust^(R), DPX-6376, and Velpar L from DuPont; Lontrel^(R) from Dow; and EL-187 from Elanco), EL-187 and Velpar L caused significant pine mortality. In greenhouse studies, EL-187 killed 1 year old loblolly pine at all rates tested (1-4# ai/a). In field tests on 3 year old loblolly, 2 and 4# ai/a resulted in 100% mortality.

Velpar L applied to 1 month old and 1 year old (since planting) loblolly tubelings at 2# ai/a resulted in 46% and 1% mortality respectively.

Lontrel, Oust and DPX-6376 appear safe on pine at rates up to 2, 1/4, and 1/4# ai/a respectively regardless of pine age. Oust and DPX-6376 appear safe on 1 year and older pines at rates up to 2# ai/acre. All three of the above appear safer on pine than Velpar L at effective herbicidal rates.

INTRODUCTION

Several new chemicals are showing promise for applications in forestry. DPX-6376 and Oust (formerly DPX-5648) have shown promise for herbaceous weed control (1,2) with pre- and post-emergent activity. Oust, DPX-6376, Lontrel, Velpar L, and EL-187 appear effective against kudzu (Pueraria lobata (Willd.) Ohwi) under some conditions (3); and DPX-6376 also appears effective against saw palmetto (Serenoa repens (Bartram) Small), unpublished data.

Discussion of herbicides in this paper does not constitute recommendation of their use or imply that used discussed here are registered. If herbicides are handled, applied, or disposed of improperly, they can harm humans, domestic animals, desirable plants, and pollinating insects, fish or other wildlife, and may contaminate water supplies. Use herbicides only when needed and handle them with care. Follow the directions and heed all precautions on the container label.

Use of trade names is for the reader's information and convenience. Such use does not constitute official endorsement or approval by the U.S. Department of Agriculture to the exclusion of any other suitable product.

This paper reports observations of loblolly pine tolerance to these compounds in greenhouse and field studies.

MATERIALS & METHODS

Greenhouse Studies. Studies were conducted in a greenhouse in 1981 and 1982 to establish loblolly pine's approximate safe rates for EL-187, Oust, DPX-6376 and Lontrel. All herbicides were applied as foliar sprays. Three 1-year-old potted seedlings were individually sprayed at each application rate and observed for 1 year following treatment.

Field Studies. Studies were conducted in the field in 1982 on loblolly pine which had been outplanted for 1 month, 1 year and 3 years prior to treatment. All pines were in an active growth flush at the time of treatment with foliar spray. For the 1 month and 1 year old treated pines, studies were replicated 4 times with a total of 25-50 trees in each replication. The study on 3 year old pine was replicated 3 times with 10 pines in each replication.

RESULTS

Greenhouse Studies. Table 1 presents a summary of 1 year old pine response to the tested herbicides. The needle kill observed with DPX-6376 and Oust treatment began with development of chlorosis and reflexing of the needles; this was followed by browning. By comparison, needle kill by hexazinone began with bronze coloration followed by browning while with EL-187 the browning was immediate. With Lontrel some chlorosis appeared prior to browning but in the absence of abnormal growth of the needles.

Table 1. Response of 1 year old pine seedlings to foliar treatment with several new herbicides. Tests were conducted in the greenhouse.

Chemical	RATE (# AI/A)				
	<u>1/4</u>	<u>1/2</u>	<u>1</u>	<u>2</u>	<u>4</u>
	Pine Condition ¹				
DPX-6376	NK	NK	NK	M	M
EL-187	-	-	D	D	D
Lontrel	-	NE	NK	NK	-
Oust	-	NE	NK	NK	NK
Velpar L	-	NK	M	M	-

¹D = all plants died, NE = no effect, NK = some needles were killed but plants recovered, M = some mortality was observed.

Table 2. Mortality of loblolly pines following foliar application of herbicides under field conditions. Pine age is expressed as time elapsed between outplanting and treatment. All trees were in an active growth flush at the time of application.

AGE	CHEMICAL												
	RATE (# AI/A)												
	Mortality ¹												
	DPX-6376					EL-187		Oust			Velpar L		Untreated
	1/8	1/4	1/2	1	2	2	4	1/8	1/4	1/2	1	2	
1 month	10	9	-	-	-	-	-	3	7	-	-	46	27
1 year	1	0	2	-	-	-	-	0	1	3	1	1	1
3 year	-	-	-	0	7	100	100	-	-	-	-	-	0

¹All figures are %, - = not tested.

Responses of pine to DPX-6376, Oust, and Velpar L are comparable to the general plant responses reported elsewhere for ureas and triazines. The response to EL-187 was so sudden that no symptoms were observed prior to death. The response to Lontrel, a chlorinated picolinic acid, was expected to produce some epinastic growth but this was not observed.

Field Studies. Table 2 presents a summary of 1 month old to 3 year old loblolly pine response to several herbicides in the field.

Herbicide damage was greatest to the youngest pines and increased slightly along with application rate. Unacceptable levels of damage were observed on EL-187 treated pines at all rates and on the 1 month old pine with 2# ai/a Velpar.

One year old seedlings treated with DPX-6376 and Oust showed chlorosis and needle reflexing at 8 oz ai/a 3 months after application. The 1 month old seedlings showed these symptoms at 1/4# ai/a for the DPX-6376 treatment. By 6 months following application these symptoms had disappeared and all pines appeared normal. Three year old pines treated with DPX-6376 at 1 and 2# ai/a exhibited the same symptoms but did not recover as quickly as the younger seedlings treated with lower rates. At the 2# rate, 3 year old pines had many dead needles at branch apexes and needles were very dense, short, and reflexed to give a pinwheel appearance 3 months after treatment.

CONCLUSIONS

Oust, DPX-6376, and Lontrel appear safe on loblolly pine at herbicide effective rates for all ages of seedlings. The slight damage observed on young pine seedlings treated with Oust and DPX-6376 is not likely to be a problem in operational applications since it occurred at 2x rates or higher. Velpar L is safe at effective rates for pine 1 year old and older even when applied during periods of active growth.

LITERATURE CITED

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