Auburn University
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RESEARCH REPORT 00-8

PRELIMINARY TRIALS WITH A NEW FORMULATION OF OXADIAZON

by
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INTRODUCTION

The granular formulation of oxadiazon (Chipco Ronstar 2G® or Ronstar G®) was registered in 1978 for use in forest nurseries growing loblolly pine, slash pine and eastern white pine. It also can be used on a number of field-grown hardwoods. This herbicide is marketed by Aventis ES and by Rhone-Poulenc. The granular formulation causes less injury to plants than the old EC formulation (which is no longer sold). In the past, good weed control was obtained in hardwood seedbeds by applying 50 pounds of the granular formulation per acre (1 lb. ai/acre) per month for a total of three applications. In some Coop studies, injury to leaves was noticed when treating one-month-old sweetgum and sycamore with a 100 pound/acre rate (2 lbs. ai/acre).

Although this herbicide can provide excellent weed control, its use in forest tree nurseries has been limited due to the cost. One application of 150 lbs of product/acre can cost $219 per acre. Recently, a new formulation was developed which can be mixed with water and applied with a herbicide-sprayer. Each 1-lb. water-soluble packet (WSP) contains ½ lb. of oxadiazon. Therefore, two packets equal 1 lb. of active ingredient (ai). The cost of treating an acre with 3 lbs ai (or 6 1-lb bags) may be $156. Therefore, the WSP formulation can be less expensive and easier to apply than the granular application. Some nursery managers have asked if the new WSP formulation could be applied over-the-top of young pine seedlings. The current label permits use as a directed spray to the soil surface for a wide variety of trees and conifers. However, when applied as an over-the-top spray, only a few conifer species such as eastern white pine, Fraser fir and eastern red cedar are mentioned on the label. Although loblolly pine and slash pine appear on the granular label, they are not mentioned on the WSP label. We wanted to know if young loblolly pine seedlings would tolerate an over-the-top application of the WSP formulation.

Current WSP labels (either the Aventis or Rhone-Poulenc label) indicates the herbicide can be applied as a directed spray to the soil around newly transplanted and established plants. "Application can be made to actively growing or dormant plants. However, RONSTAR 50 WSP should not be applied during bud break or during the 4 weeks after bud break. Rainfall or overhead irrigation (one-half inch) immediately after application will improved weed control activity. Rainfall or overhead irrigation immediately after over the top sprays is required to move the RONSTAR 50WSP from the foliage to the soil surface." Application should be made when leaves are absolutely dry to avoid foliar burn and irrigation used to wash any residue from the leaf surfaces. Since the herbicide has no postemergence activity, it is important to remove existing weeds before application.

METHODOLOGY

Field experiments were installed at three loblolly pine nurseries during the 1999 growing season. Seedlings were approximately 4- to 6-weeks old at time of treatment. At the Alabama Forestry Commission Nursery at Atmore, seed were sown on April 15 and the granular formulation was applied on May 18. At the South Carolina Forestry Commission Nursery at Trenton, seed were sown on April 21 and emerged seedlings were treated with the WSP formulation on June 9. Two studies were installed at the Joshua Timberlands Nursery in Elberta, Alabama (one WSP study and one 2G study). Seed were sown on April 21 and the herbicide was applied on May 19.

Each study was installed as a randomized complete block design with four replications. Plot size was 10-feet long and one bed wide. Each study involved three herbicide rates plus an untreated control. Seedling density (i.e. number of seedlings per square foot) were recorded in October (October 20th - Elberta; October 21st - Atmore; October 25th - Trenton). Seedling samples were hand-lifted from each plot and were transported to Auburn for analysis. Heights and root-collar diameters were measured on 25 seedlings per plot. Oven-dry weights of shoots and roots were recorded.

RESULTS

The WSP formulation of oxadiazon did not injure loblolly pine seedbeds at either the Elberta Nursery or the Trenton Nursery. Rates as high as 4 lbs. ai/acre did not affect the stocking, RCD, height or biomass of very young seedlings (Tables 1 and 2). In no case was there a significant treatment effect at the 10% level of probability.

The 2G formulation of oxadiazon did not result in a significant treatment effect at the 0.05 level of probability (Tables 3 and 4). However, at Atmore Nursery, there was a trend toward increasing shoot weight with increasing herbicide rate (Table 4). This effect was significant at the 10% level of probability.

MANAGEMENT IMPLICATIONS

Although the current WSP label makes no mention of an over-the-top application to loblolly pine, it appears that newly-emerged seedlings are tolerant to this method of application.

Table 1. Morphological characteristics for loblolly pine seedlings after treatment with a 50% WSP formulation of oxadiazon at the Elberta Nursery.

Rate (lbs ai/ac)	Density (# / sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	24.6	4.0	28.8	2.58	0.27
2	25.1	4.0	31.0	2.88	0.29
3	23.9	4.1	29.6	2.82	0.30
4	23.4	4.0	28.4	2.55	0.29
P > F-value	*0.40*	*0.84*	*0.29*	*0.56*	*0.13*
(LSD)	*2.2*	*0.34*	*3.1*	*0.62*	*0.024*

Table 2. Morphological characteristics for loblolly pine seedlings after treatment with a 50% WSP formulation of oxadiazon at the Trenton Nursery.

Rate (lbs ai/ac)	Density (# / sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	30.7	2.8	13.7	1.03	0.31
2	32.9	2.7	12.9	0.88	0.30
3	29.7	2.7	12.7	0.96	0.32
4	30.7	2.7	13.7	1.01	0.33
P > F-value	*0.59*	*0.84*	*0.50*	*0.59*	*0.82*
(LSD)	*5.2*	*0.28*	*1.8*	*0.25*	*0.080*

Table 3. Morphological characteristics for loblolly pine seedlings after treatment with a 2G formulation of oxadiazon at the Elberta Nursery.

Rate (lbs ai/ac)	Density (# / sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	24.3	4.3	32.3	2.94	0.29
2	24.4	4.3	31.7	3.02	0.28
3	24.6	4.2	31.0	2.89	0.29
4	23.5	4.4	36.6	2.90	0.28
P > F-value	*0.86*	*0.36*	*0.25*	*0.88*	*0.64*
(LSD)	*3.2*	*0.20*	*6.3*	*0.41*	*0.021*

Table 4. Morphological characteristics for loblolly pine seedlings after treatment with a 2G formulation of oxadiazon at the Atmore Nursery.

Rate (lbs ai/ac)	Density (# / sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	14.9 ab	4.3	25.8	2.97 a	0.54
2	15.4 a	4.1	25.7	2.76 ab	0.51
3	13.0 b	4.3	26.0	2.77 ab	0.55
4	15.6 a	4.1	24.9	2.54 b	0.48
P > F-value	*0.057*	*0.28*	*0.27*	*0.081*	*0.35*
(LSD)	*2.0*	*0.31*	*1.2*	*0.32*	*0.086*