Auburn University
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Cooperative

RESEARCH REPORT 01-9

PRELIMINARY TRIALS WITH DITHIOPYR

by
David B. South and Tommy Hill

INTRODUCTION

The herbicide dithiopyr (Dimension®) is registered for use in turf and landscape ornamentals including: loblolly pine, slash pine, longleaf pine, Virginia pine, eastern white pine, and various hardwoods such as sweetgum, sycamore and oaks. It is intended for use on landscape trees (trees grown for aesthetic purposes in landscaped areas). The label cautions the user about applying this product as an over-the-top broadcast spray. The recommended rate for crabgrass in the southern United States is 0.25 lb a.i./acre followed by a second application five to ten weeks later. Currently, two formulations are available: an EC formulation containing 1 pound of dithiopyr per gallon and a water soluble packet (WSP) formulation containing 40% active ingredient. In the past, a granular formulation was available as Strikeout®

This herbicide has preemergence and early postemergence activity on crabgrass. It also has some preemergence activity on small seeded broadleaves including spotted spurge (Norcini and Aldrich. 1992; Derr 1994). A few trials with dithiopyr have been conducted at ornamental nurseries but there have been no tests on pine seedlings in seedbeds. Since prostrate spurge is on the herbicide label, this herbicide was screened for use on loblolly and slash pine seedbeds (as an over-the-top broadcast spray).

METHODOLOGY

Five experiments were installed at four nurseries during the 2000 growing season. At the Alabama Forestry Commission Nursery at Atmore, seed were sown on April 16 and seedlings were treated on June 7 (7 weeks after sowing). At The Timber Company Nursery at Shubuta, Mississippi, seed were sown on April 10 and seedlings treated on June 1 (7 weeks after sowing) and on July 18 (14 weeks after sowing). At the Joshua Timberlands Nursery in Elberta, Alabama, seed were sown on May 1 and the herbicide applied on June 8 (5 weeks after sowing). At the Taylor Nursery at Trenton, South Carolina, seed were sown on March 31 and the herbicide applied on May 17 (almost 7 weeks after sowing).

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 treatments plus an untreated control. Solutions of the EC formulation (1 pound a.i./gallon) were applied using a CO_2-backpack sprayer calibrated to apply 28.4 gallons per acre. Treatments at three nurseries included rates of 1, 2 and 3 quarts of product/acre. At the Trenton Nursery, rates tested were 2, 4 and 6 quarts/acre. Seedling densities (i.e. number of seedlings per square foot) were recorded in mid-October using a counting 1' x 4' counting frame. Seedling samples were hand-lifted from the center of 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 for each 25-seedling sample. When F-values for treatment effects were significant (0.05 level), means were separated using Duncan's Multiple Range Test.

RESULTS

Soil texture at the Shubuta Nursery is very sandy, while soils at the Elberta and Trenton Nurseries are classified as loamy sands. Soil at the Atmore Nursery was classified as a sandy loam (Table 1). Injury was noticed on young seedlings soon after treatment with 1 and 1.5 lb a.i./acre at the Trenton Nursery. However, at lifting, only the 1.5 lb a.i./acre rate reduced average root dry weight (Table 2).

Due to visual injury at the Trenton Nursery, rates were lowered in subsequent studies (to 0.25 to 0.75 lb a.i./acre). No statistically significant reductions in seedbed density, RCD, height, or dry weights were observed when the herbicide was applied at rates less than 1 pound a.i./acre (Tables 3-6). In fact, the 0.75 lb a.i./acre rate produced more root mass at the Elberta Nursery.

MANAGEMENT IMPLICATIONS

Young loblolly and slash pine seedlings have demonstrated some tolerance to dithiopyr. However, casual observations indicated this herbicide was not completely effective in controlling prostrate spurge at the Shubuta Nursery. For this reason, no tests of this herbicide will be made in 2001.

REFERENCES

Derr, J.F. 1994. Weed control in container-grown herbaceous perennials. Hortscience 29:95-97

Norcini, J.G. and J.H. Aldrich. 1992. Spotted spurge control and phytotoxicity to daylily from preemergence herbicides. Journal of Environmental horticulture 10:14-17.

Table 1. Soil textures, organic matter and soil acidity levels at four nurseries.

Nursery	Soil Texture	Sand	Silt	Organic Matter	pH
		%	%	%	
Atmore	Sandy loam			3.2	4.8
Elberta	Loamy sand			1.2	5.4
Shubuta	Sand			1.2	5.2
Taylor	Loamy sand			1.2	6.5

Table 2. Morphological characteristics for loblolly pine seedlings lifted in October at the Trenton Nursery.

Dithiopyr Rate lb ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	28.6	4.0	30.8	2.99	0.34 a
0.5	27.0	4.1	31.6	3.03	0.34 a
1.0	27.4	3.8	29.0	2.86	0.31 ab
1.5	27.8	3.9	30.5	3.18	0.28 b
P > F-value	*0.43*	*0.18*	*0.11*	*0.45*	*0.01*
(LSD)	*2.1*	*0.26*	*2.2*	*0.44*	*0.034*

Table 3. Morphological characteristics for slash pine seedlings lifted in October at the Atmore Nursery.

Dithiopyr Rate lb ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	17.9	3.7	26.4	2.73	0.31
0.25	15.9	3.5	24.4	2.50	0.30
0.5	16.9	3.7	25.7	2.81	0.35
0.75	16.3	3.6	24.8	2.56	0.32
P > F-value	*0.65*	*0.49*	*0.12*	*0.64*	*0.56*
(LSD)	*3.6*	*0.35*	*1.7*	*0.60*	*0.081*

Table 4. Morphological characteristics for loblolly pine seedlings lifted in October at the Elberta Nursery.

Dithiopyr Rate lb ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	19.8	3.85 ab	26.0	2.08	0.20 b
0.25	19.9	3.86 ab	26.3	2.09	0.19 b
0.5	20.5	3.79 b	27.0	2.09	0.18 b
0.75	19.0	4.08 a	26.9	2.29	0.24 a
P > F-value	*0.67*	*0.04*	*0.12*	*0.47*	*0.01*
(LSD)	*2.8*	*0.25*	*1.1*	*0.33*	*0.031*

Table 5. Morphological characteristics for loblolly pine seedlings lifted in October at the Shubuta Nursery (seedlings treated in June).

Dithiopyr Rate lb ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	18.5	4.6	29.5	3.53	0.50
0.25	17.3	4.6	28.9	3.21	0.45
0.5	16.4	4.7	28.9	3.51	0.50
0.75	18.5	4.5	28.5	3.46	0.47
P > F-value	*0.25*	*0.76*	*0.22*	*0.51*	*0.18*
(LSD)	*2.5*	*0.31*	*1.0*	*0.52*	*0.055*

Table 6. Morphological characteristics for loblolly pine seedlings lifted in October at the Shubuta Nursery (seedlings treated in July).

Dithiopyr Rate lb ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	21.6	4.2	30.6	3.29	0.43
0.25	20.2	4.2	31.3	3.22	0.40
0.5	19.9	4.3	29.6	3.21	0.40
0.75	20.9	4.3	30.6	3.32	0.42
P > F-value	*0.38*	*0.91*	*0.14*	*0.81*	*0.85*
(LSD)	*2.2*	*0.23*	*1.5*	*0.30*	*0.071*