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RESEARCH REPORT 02-4

PRELIMINARY TRIALS WITH THIAZOPYR

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INTRODUCTION

Thiazopyr (Visor®2E) is within the pyridine chemical family and provides preemergence annual grass and certain broadleaf weed control. Visor®2E disrupts cell division by inhibiting mitosis (Ahrens 1994, Chandran and Singh 2000). Studies with thiazopyr have been conducted on pine nurseries in Spain. One study found that aleppo pine tolerated thiazopyr at 0.42 lbs/ac (Fernandez-Cavada et. al. 1995) while a second study found that thiazopyr resulted in "serious" damage to 6 different pine species (Penuelas et. al. 1995). Thiazopyr had no phytotoxic effect on bare-root Douglas-fir seedlings but did cause significant damage to bare-root western hemlock seedlings in the Pacific Northwest at rates of 0.5 and 1 lb/ac (Haase and Rose 1998). These studies show variable results of phytotoxicity in pines and other conifers. Nurseries in the SE often have problems with either prostrate or spotted spurge. Although we could not find any studies that looked at control of spurge using thiazopyr, the label says that Visor®2E controls this weed. Some studies indicate good control of yellow nutsedge (Schlesselman et. al. 1997, Czarnota et. al. 1998), while others show little or no control of nutsedge (Neal 1998, Chandran and Singh 2000). The Coop installed studies to determine if Visor®2E affects seedling growth and appearance.

METHODOLOGY

Four experiments were installed at three nurseries during the 2001 growing season. Three studies were established in loblolly pine seedbeds and one was applied to slash pine seedlings. At the Georgia Forestry Commission Nursery at Byromville, slash and loblolly pine seed were sown on April 23 and seedlings were treated on August 2 (14 weeks after sowing). At the International Forest

Company Nursery at Ashburn, Georgia, seed were sown on May 3 and seedlings were treated on August 2 (13 weeks after sowing). At the Timber Company Nursery in Shubuta, Mississippi, seed were sown on April 10 and were treated on June 28 (11 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 one herbicide treatment plus an untreated control. Solutions of the EC formulation were applied using a CO_2-backpack sprayer calibrated to apply 28.4 gallons per acre. Following label recommendations, thiazopyr was applied at its highest rate legal for grapefruits and oranges during this study since the control of spurge and suppression of nutsedge is best achieved using this rate. The treatment was 4 pts of product/acre (1 lb ai/acre). Seedling densities (i.e. number of seedlings per square foot) were recorded from early-November to late-October using a 1' x 4' counting frame. Seedling samples were hand-lifted from the center of each plot and 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 sample. Additionally, at the The Timber Company Nursery in Shubuta, on August 8th (17 weeks after sowing) the number of spurge plants were counted in each plot.

RESULTS

Soil texture information is provided in Table 1. Application of Visor®2E on loamy sand nursery soils decreased height growth in both slash and loblolly pine seedlings (Tables 2, 3, and 4). The herbicide increased RCD at Byromville on loamy sand soils (Tables 2 and 3). Dry shoot weight was decreased following treatment of loblolly pine (Tables 3 and 4). However, slash pine appeared to offset some height growth loss by increases in diameter growth (Table 3). Shoot growth probably decreased in the treated area at the Ashburn nursery because of greater seedbed densities (Table 4). Treatments with Visor®2E at Byromville increased root growth (Tables 2 and 3). Loblolly pine showed variable results on loamy sand soils in root growth following treatment (Tables 3 and 4). The application of Visor®2E had little affect on total dry weight production on loamy sand soils (Tables 2, 3 and 4).

Visor®2E appears to have little affect on loblolly pine seedling growth at Shubuta on a sand soil (Table 5). Thiazopyr may have had little affect on seedling growth at Shubuta since it was applied in June and this site has a pH of 5.2. The other two nurseries showed more response when treatments were applied in August.

Spurge was effectively controlled by Visor®2E at the Shubuta nursery. The untreated area had an average of 22.5 plants per sq. ft. (ranging from 13 – 30), while the treated area only had an average of 2 per sq. ft. (ranging from 1 to 4). It is obvious that Visor®2E effectively controls spurge.

Although growth was not affected, Visor®2E caused a yellowing of pines at the Byromville nursery. Additionally, root galls were observed on seedlings at the Byromville nursery similar to the chemical

prodiamine (Barricade®, Endurance®, and Factor®). Galls were not observed at the other two nurseries. Galls might account for the increase in RCD at Byromville.

MANAGEMENT IMPLICATIONS

Delaying application of Visor®2E until later in the growing season, when seedlings are larger, may cause more seedling response. Height growth appears to be stunted, but RCD growth and root growth may be increased. Overall production per unit area did not appear to be reduced by the application of Visor®2E. Therefore, this product might affect spurge with little detrimental effect on seedling growth. However, weed control must be weighed against the potential loss in sales due to yellowing and the possibility that root galls may form on seedlings. Additional studies will be conducted in FY 2002.

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

Nursery	Species	Soil Texture	Sand %	Silt %	Organic Matter %	pH
Byromville	slash	Loamy sand	86	7	0.7	6.3
Byromville	loblolly	Loamy sand	87	7	0.7	6.0
Ashburn	loblolly	Loamy sand	87	8	0.9	5.9
Shubuta	loblolly	Sand	96	3	0.8	5.2

Table 2. Morphological characteristics for slash pine seedlings lifted on October 30th at the Byromville Nursery (seedlings treated in August).

Thiazopyr Rate lb ai/acre	Density (#/sq ft)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)	Total dry weight (g/sq ft)
0	18.8	2.9	26.4	1.60	0.22	34.1
1	17.9	3.5	25.2	1.82	0.28	37.4
P > F-value	*0.37*	*0.02*	*0.04*	*0.23*	*0.11*	*0.51*
(LSD)	*2.8*	*0.44*	*1.1*	*0.48*	*0.088*	*14.3*

Table 3. Morphological characteristics for loblolly pine seedlings lifted on October 30th at the Byromville Nursery (seedlings treated in August).

Thiazopyr Rate lb ai/acre	Density (#/sq ft)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)	Total dry weight (g/sq ft)
0	20.2	3.4	36.9	2.63	0.26	58.5
	20.8	3.8	33.0	2.36	0.30	55.6
P > F-value	*0.28*	*0.02*	*0.05*	*0.17*	*0.08*	*0.36*
(LSD)	*1.4*	*0.21*	*3.8*	*0.47*	*0.044*	*8.7*

Table 4. Morphological characteristics for loblolly pine seedlings lifted on December 6th at the Ashburn Nursery (seedlings treated in August).

Thiazopyr Rate lb ai/acre	Density (#/sq ft)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)	Total dry weight (g/sq ft)
0	11.9	5.0	23.9	2.86	1.26	48.9
	14.6	4.9	21.5	2.40	1.00	51.1
P > F-value	*0.39*	*0.96*	*0.07*	*0.05*	*0.25*	*0.83*
(LSD)	*8.3*	*0.60*	*2.7*	*0.47*	*0.581*	*29.6*

Table 5. Morphological characteristics for loblolly pine seedlings lifted on November 7th at the Shubuta Nursery (seedlings treated in June), and number of living spurge plants.

Thiazopyr Rate lb ai/acre	Density (#/sq ft)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)	Total dry weight (g/sq ft)	Number of spurge plants (#/sq ft)
0	24.2	4.7	33.2	3.32	0.39	89.5	22.2
1	23.3	4.9	32.2	3.30	0.40	86.3	2.0
P > F-value	*0.53*	*0.06*	*0.23*	*0.90*	*0.66*	*0.48*	*0.01*
(LSD)	*3.9*	*0.22*	*2.2*	*0.34*	*0.067*	*12.7*	*11.72*