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PRELIMINARY TRIALS WITH CLORANSULAM-METHYL

by
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INTRODUCTION

The herbicide cloransulam-methyl (FirstRate®) is registered for use in soybeans and has activity on sicklepod, morning glory and yellow nutsedge. This sulfonamide herbicide can be applied before sowing, preemergence or postemergence to the weeds and crop. In one test, rates of 14 g a.i./acre provided 60 to 91% control of yellow nutsedge (Krausz et al. 1998). Rates as low as 5 g a.i./acre have provided some degree of control over yellow nutsedge (Askew et al. 1999). The current formulation is a water disbursable granule (WDG) that contains 84% active ingredient. No tests with cloransulam in forest tree nurseries have been reported. Since yellow nutsedge is on the herbicide label, this herbicide was screened for use on loblolly pine, slash pine and eastern white pine seedbeds.

METHODOLOGY

Nine experiments were installed at five nurseries during the 2000 growing season. At the Alabama Forestry Commission Nursery at Atmore, seed were sown on April 16 and the seedlings were treated on June 7 (7 weeks after sowing) and on July 7 (11 weeks after sowing). At the Weyerhaeuser Nursery at Pine Hill, Alabama, seed were sown on May 18 and seedlings were treated on June 6 (3 weeks after sowing) and July 5 (11 weeks after sowing). At the Joshua Timberlands Nursery in Elberta, Alabama, seed were sown on May 1 and the herbicide was applied on June 8 (5 weeks after sowing) and July 6 (9 weeks after sowing). At the Flint River Nursery at Byromville, Georgia, slash pine seed were sown on April 18 and the herbicide was applied on May 23 (5 weeks after sowing) and June 21 (9 weeks after sowing). At the Augusta Nursery in Crimora, Virginia, rising 2+0 eastern white pine were treated on June 13.

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 WDG formulation were applied using a CO_2-backpack sprayer calibrated to apply 28.4 gallons per acre. Treatments included rates of 0.3, 0.6 and 1.2 ounce of product/acre. Seedling densities (i.e. number of seedlings per square foot) were recorded in mid-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 (10 seedlings per plot for eastern white pine). Oven-dry weights of shoots and roots were recorded for each sample. When F-values for treatment effects were significant (0.05 level), means were separated using Duncan's Multiple Range Test.

RESULTS

Soil texture information is provided in Table 1. The herbicide injured slash pine seedlings at the Byromville Nursery (Tables 2 and 3). Height growth was stunted regardless of month of application. Although it cannot be determined by these data, it seems likely that slash pine is less tolerant of this herbicide than loblolly pine.

At the Crimora Nursery and at the Pine Hill Nursery, plots were installed on areas containing high populations of nutsedge. The nutsedge likely reduced seedling growth on all plots at Pine Hill and reduced seedling densities at Crimora. Applying this herbicide in June increased seedling production by about 33% (Table 4). No significant injury was observed on eastern white pine. The fine textured soil at Crimora and the high organic matter content likely decreased the availability of this herbicide to pine roots. Suppression of nutsedge at Pine Hill and Byromville with this herbicide was less than impressive.

Root weight was reduced by a June application at the Atmore Nursery (Table 5). However, seedlings were not affected when the herbicide was applied in July (Table 6). It seems likely that tolerance of loblolly pine to cloransulam-methyl increases with seedling age.

MANAGEMENT IMPLICATIONS

Loblolly pine seedlings (8 weeks old) and rising 2+0 eastern white pine seedlings have demonstrated some tolerance to cloransulam-methyl at 12 g a.i./acre. Slash pine may be sensitive to this herbicide. However, this herbicide is currently registered only for use on soybeans.

REFERENCES

Askew, S.D., J.W. Wilcut and V.B. Langston. 1999. Weed management in soybean (Glycine max) with preplant-incorporated herbicides and cloransulam-methyl. Weed Technology 13:276-282.

Krausz, R.F., G. Dapusta, and J.L. Matthews. 1998. Sulfentrazone for weed control in soybean (Glycine max). Weed Technology 12:684-689.

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

Nursery	Soil Texture	Sand %	Silt %	Organic Matter %	pH
Atmore	Sandy loam	57	26	3.2	4.8
Elberta	Loamy sand	82	10	1.2	5.4
Pine Hill	Sandy loam	68	20	2.0	5.6
Byromville	Loamy sand	87	5	1.2	6.9
Crimora	Loam	--	--	3.9	--

Table 2. Morphological characteristics for slash pine seedlings lifted in October at the Byromville Nursery (seedlings treated in May).

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	21.6	3.4	25.8 a	2.20 a	0.19
12	18.9	2.9	22.3 b	1.98 ab	0.24
24	20.8	2.7	20.8 b	1.43 c	0.16
48	19.8	2.9	20.8 b	1.69 bc	0.25
P > F-value	*0.37*	*0.12*	*0.01*	*0.02*	*0.07*
(LSD)	*3.4*	*0.54*	*2.8*	*0.45*	*0.042*

Table 3. Morphological characteristics for slash pine seedlings lifted in October at the Byromville Nursery (seedlings treated in June).

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	21.7	3.7	30.6 a	2.44	0.20
12	20.8	3.2	27.0 bc	2.38	0.21
24	20.0	3.2	27.3 b	2.57	0.23
48	18.3	3.1	24.3 c	1.88	0.22
P > F-value	*0.17*	*0.23*	*0.005*	*0.12*	*0.87*
(LSD)	*3.2*	*0.63*	*2.8*	*0.70*	*0.087*

Table 4. Morphological characteristics for eastern white pine seedlings lifted in October at the Crimora Nursery.

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	8.6 b	2.0	12.8	0.57	0.15
12	12.8 a	2.0	12.6	0.61	0.17
24	14.9 a	2.0	12.8	0.69	0.19
28	12.2 ab	2.0	12.0	0.59	0.18
P > F-value	*0.03*	*0.87*	*0.47*	*0.21*	*0.79*
(LSD)	*4.0*	*0.24*	*1.3*	*0.12*	*0.080*

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

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	18.5	3.6	24.1	2.55	0.27 a
12	19.4	3.5	24.3	2.50	0.24 ab
24	19.7	3.5	24.8	2.62	0.23 ab
28	20.0	3.3	24.4	2.26	0.20 b
P > F-value	*0.77*	*0.14*	*0.72*	*0.44*	*0.04*
(LSD)	*3.5*	*0.28*	*1.4*	*0.50*	*0.057*

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

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	19.8	2.7	26.5	1.51	0.15
12	19.9	2.9	27.2	1.79	0.19
24	20.5	2.6	25.7	1.44	0.15
48	19.0	2.8	25.8	1.24	0.17
P > F-value	*0.67*	*0.24*	*0.64*	*0.41*	*0.20*
(LSD)	*2.8*	*0.36*	*3.0*	*0.71*	*0.051*

Table 7. Morphological characteristics for loblolly pine seedlings lifted in October at the Elberta Nursery (seedlings treated in June).

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	20.6	3.4	24.5	2.00	0.23
12	21.7	3.2	23.1	1.81	0.19
24	19.9	3.3	23.3	1.93	0.20
48	20.1	3.4	24.4	2.13	0.22
P > F-value	*0.17*	*0.42*	*0.25*	*0.15*	*0.12*
(LSD)	*1.8*	*0.27*	*1.9*	*0.27*	*0.042*

Table 8. Morphological characteristics for loblolly pine seedlings lifted in October at the Elberta Nursery (seedlings treated in July).

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	20.1	3.9	24.9	1.80	0.40
12	20.9	3.8	23.6	1.60	0.39
24	21.8	3.5	24.2	1.79	0.39
48	21.2	3.5	23.7	1.75	0.40
P > F-value	*0.38*	*0.51*	*0.47*	*0.82*	*0.92*
(LSD)	*2.2*	*0.58*	*2.0*	*0.58*	*0.071*

Table 9. Morphological characteristics for loblolly pine seedlings lifted in October at the Pine Hill Nursery (seedlings treated in June).

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	15.9	2.9	31.1	3.05	0.39
12	15.8	2.7	28.6	2.66	0.35
24	16.2	2.6	30.2	2.70	0.37
48	15.6	2.9	30.8	3.10	0.40
P > F-value	*0.97*	*0.66*	*0.42*	*0.71*	*0.61*
(LSD)	*2.6*	*0.56*	*3.5*	*1.06*	*0.091*

Table 10. Morphological characteristics for loblolly pine seedlings lifted in October at the Pine Hill Nursery (seedlings treated in July).

Cloransulam Rate g ai/acre	Density (#/sq.ft.)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
0	12.7	2.9	27.1	3.01	0.40
12	12.5	2.9	27.2	2.94	0.39
24	15.0	2.9	27.4	2.51	0.35
48	15.4	3.3	29.8	3.12	0.41
P > F-value	*0.42*	*0.23*	*0.25*	*0.59*	*0.84*
(LSD)	*4.7*	*0.63*	*3.2*	*1.03*	*0.161*