Auburn University
Southern Forest Nursery
Management Cooperative

RESEARCH REPORT 09-02

PRELIMINARY RESULTS FROM TESTING NUTSEDGE HERBICIDES IN LOBLOLLY PINE SEEDBEDS

by
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INTRODUCTION

Researchers with the Auburn University Southern Forest Nursery Management Cooperative have been looking for a selective herbicide for controlling nutsedge (*Cyperus* spp.) since 1971. Two new herbicides that have activity on yellow nutsedge (*Cyperus escunlentus*) were tested in 2008. Imazosulfuron (V-10142) is a pyrimidinylsulfonylurea herbicide that is not yet registered in the United States. It is active at low application rates to control annual and perennial broad-leaf weeds and sedges. Control of yellow nutsedge with imazosulfuron is similar to that of halosulfuron (Jackson et al. 2009). The half-life in soil varies from approximately 4 days in anaerobic soil to 70 days in aerobic soil (Morrica et al. 2001).

Rimsulfuron (Matrix®) is a pyrimidinylsulfonylurea herbicide that is registered for use in potatoes, tomatoes, citrus, and tree nuts like almond (Hansen 2008), chestnut, hickory nut, pecan and walnut. According to the label, the herbicide provides some preemergence control of yellow nutsedge and some "partial" control when applied after nutsedge emergence. In some crops, postemergence applications at 0.5 oz a.i./acre provided 51 to 63% control of purple nutsedge (*Cyperus rotundus*) and 60 to 66% control of yellow nutsedge (Norsworthy and Meister 2007). Since rimsulfuron is absorbed by both roots and foliage, weeds are controlled by a combination of pre- and post-emergence activity.

METHODOLOGY

Two studies were installed during the 2008 growing season. At the Trenton Nursery (SC), loblolly pine seed were sown on April 16 and the seedlings were treated on June 24 (10 weeks after sowing). Agrilock was used to stabilize beds after sowing. At the Delano Nursery (TN), loblolly pine seeds were sown and mulched with sawdust on April 17. Seedlings were treated on June 23 (9 weeks after sowing).

Each study was a randomized complete block design with five replications for each treatment. Plot size was 10-feet long and one seedling bed wide (4 ft). Each study involved seven herbicide treatments plus an untreated control. Herbicides were applied using a CO_2-backpack sprayer calibrated to apply 22 gallons per acre (as a broadcast application). Imazosulfuron (75%WG) was applied at 2 and 4 oz a.i./acre and rimsulfuron (25% DF) was applied at 0.25 and 0.5 oz a.i./acre.

Seedling densities (i.e. number of seedlings per square meter) were recorded in October 2008 using a 1' x 4' counting frame. Seedling samples were hand-lifted from the center of each plot and transported to Auburn for analysis. Seedling shoot heights and root-collar diameters were measured on 25 seedlings per plot and then oven-dry weights of shoots and roots were recorded. Data were subjected to ANOVA and treatment effects were compared using contrast statements.

RESULTS

Soil texture at the Delano Nursery was classified as a sandy loam while the soil at Trenton Nursery was a loamy sand (Table 1). At the Trenton Nursery, the imazosulfuron treatment killed some seedlings (Table 2) and reduced stocking levels by 12-18%. As one might expect, the lower stocking reduced competition among seedlings and resulted in slightly larger seedlings (Table 3). In contrast, rimsulfuron at the 1X rate did not affect seedling morphology. At the Delano Nursery, bed location had an effect on seedling size (Table 4). Trees in block 1 and 2 had more roots and shoots than seedlings in block 5 (data not shown). None of the herbicide treatments affected seedling stocking or morphology at the Delano Nursery (Tables 5).

MANAGEMENT IMPLICATIONS

Preliminary results suggest that imazosulfuron (2 and 4 oz a.i./acre) lowered seed efficiency at the Trenton Nursery (loamy sand soil texture). Rimsulfuron did not appear to injury loblolly pine at either nursery. Effective nutsedge weed control will be much easier when nutsedge is controlled with herbicides in fallow or cover-crop areas that don't contain Pinus spp.

REFERENCES

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Table 1. Soil texture, organic matter (OM) and soil acidity of the loblolly pine nurseries.

Nursery	Texture	Sand	Silt	Clay	OM	pH
		----------(%)----------				
Delano, TN	sandy loam	61	29	10	1.7	4.7
Trenton, SC	loamy sand	80	11	9	1.5	5.1

Table 2. Analysis of Variance for loblolly pine seedlings as affected by herbicides at the Trenton Nursery.

Source	df	Density	RCD	Height	Shoot	Root
		---------- Probability of a greater F-value ----------				
Replication	4	0.7695	0.1880	0.0504	0.0574	0.0005
Treatment	4	0.1497	0.0841	0.2946	0.1232	0.0032
imazosulfuron vs. control	(1)	0.0433	0.1854	0.3216	0.4918	0.0060
rimsulfuron vs control	(1)	0.5684	0.1809	0.3429	0.8781	0.0291
imazosulfuron- linear	(1)	0.1498	0.8646	0.0825	0.5282	0.4188
rimsulfosulfron-linear	(1)	0.3281	0.1812	0.2530	0.7089	0.0332
Error	16					

Table 3. Morphological characteristics for loblolly pine seedlings lifted on October 15 at the Trenton Nursery.

Treatment	rate	Density (#/m^2)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
Control	0	182	4.1	21.2	2.88	0.45
imazosulfuron	1x	150	4.5	21.3	3.39	0.59
imazosulfuron	2x	161	4.3	19.2	2.71	0.47
rimsulfuron	1x	182	4.1	20.7	2.71	0.50
rimsulfuron	2x	168	4.4	19.9	2.99	0.52
(LSD)		*29.4*	*0.39*	*2.31*	*0.58*	*0.06*

Table 4. Analysis of Variance for loblolly pine seedlings as affected by herbicides at the Delano Nursery.

Source	df	Density	RCD	Height	Shoot	Root
		--------- Probability of a greater F-value ---------				
Replication	4	0.0836	0.0470	0.4906	0.0310	0.0001
Treatment	4	0.5719	0.4443	0.3814	0.5963	0.9805
imazosulfuron vs. control	(1)	0.6417	0.7135	0.4277	0.1754	0.5703
rimsulfuron vs. control	(1)	0.9343	0.3877	0.1871	0.3567	0.7357
imazosulfuron-linear	(1)	0.8491	0.3806	0.1526	0.1693	0.6992
rimsulfosulfron-linear	(1)	0.5700	0.9127	0.2229	0.2378	0.7203
Error	16					

Table 5. Morphological characteristics for loblolly pine seedlings lifted on December 1 at the Delano Nursery.

Treatment	rate	Density (#/m^2)	RCD (mm)	Height (cm)	Shoot (g)	Root (g)
Control	0	220	4.7	27.3	4.46	0.88
imazosulfuron	1x	209	4.8	27.3	4.14	0.92
imazosulfuron	2x	223	4.6	25.5	4.00	0.91
rimsulfuron	1x	216	4.6	26.0	4.32	0.90
rimsulfuron	2x	227	4.7	25.8	4.07	0.91
(LSD)		*23.6*	*0.27*	*2.39*	*0.66*	*0.167*