Auburn University
Southern Forest
Nursery Management
Cooperative

RESEARCH REPORT 02-3

CONTROL OF PURPLE NUTSEDGE WITH BROAD SPECTRUM HERBICIDES

by
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INTRODUCTION

As methyl bromide (MBr) becomes less available to control problem weeds such as nutsedge (*Cyperus sp.*) before sowing, improving alternative methods will be a priority at many nurseries to prevent weed buildup over time. The suppression of nutsedge outside of seedbeds, along riser lines, and in cover crops, with non-selective herbicides will probably become more important. An advantage of applications outside seedbeds is that effects on seedlings are less important than with over-the-top chemicals, especially for herbicides with short residuals such as glyphosate (Roundup). Candidate herbicides for this type of control are appropriately evaluated directly on target weeds and pot studies can help reduce the variability inherent with the non-normal distribution of weeds within nursery beds.

METHODOLOGY

Actively growing Purple nutsedge (*Cyperus rotundus* L.) plants were collected near Montezuma, GA on April, 25, 2001 and taken to Auburn where foliage was cut off the tubers (nuts) which were then washed to remove soil. The washed tubers dried on a bench overnight and 1,000 were randomly distributed into 100 replicates of 10-tubers-each. Replicate were weighed to establish initial weights and randomly distributed among 20 treatments of 5 replicates each. The 10 tubers of each replicate were planted 1" deep (on April 26) in one cylindrical 8" by 8" plastic pot (402 cubic inch volume) containing a sandy loam soil previously treated with MBr (2 lb MBr released under plastic tarp with 2 yards of soil) to eliminate other weed seeds. Three weeks after planting, each pot received 17 oz of a 1 tbs / gallon solution of Miracle Grow ®.

The Eptam treatment was applied to the soil and incorporated before the tubers were planted but all other treatments were applied four weeks after planting (on May 24) as foliage sprays in 24 gal/ac water. Most nutsedge were about 6" tall and vigorously growing when herbicides were applied. One hour after herbicide application, two Roundup treatments were subjected to ½" of sprinkler irrigation, monitored by placing rain gauges among the treated pots. Two Manage treatments received a second application 3 weeks after the first (on June 13). Before and after treatments, nutsedge was kept in a screened building under a clear fiberglass top and watered daily (approximately 0.10 inch water) from overhead sprinklers. All pots were harvested six months after planting (October 1, 2001) and the number and live weight of tubers and foliage weights were determined. Statistical analyses used SAS to assess differences in nutsedge growth by herbicide (analysis of variance) and the relationships between foliage and tubers (correlation and regression).

RESULTS

Initial tuber weights did not differ (α 0.05) among treatments. Table 1 presents the herbicide treatments and mean harvested numbers and weights of tubers and of foliage per pot by treatment. Figure 1, which graphically presents the same data as Table 1, shows the linear relationship between numbers of nuts and weights. A mean of 200 tubers per pot (a 20 fold increase) among controls indicates that growing conditions were good. Only five treatments had significantly more tubers than the best herbicide. That is, only the Roundup treatments watered an hour after treatment, the Reflex treatment and the lowest rates of Manage and of Outrider were not as good as the best treatment. Of course, pot-studies are only a starting place for field-testing and results will probably differ where competition is a factor. For example, no nutsedge foliage was produced in Eptam treated pots before June (2 months post planting) and this would have put the weed at a competitive disadvantage with any cover crop that the plants in this study did not have.

We believe that the number of tubers is a good indication herbicide affects but have no proof that it is any better an indication than foliage weight or total weight of tubers. Anyway, foliage weight and total weights of tubers correlated with numbers of tubers ($r = 0.90, p < 0.01$) and the assessment of results, would change little if those variables were put first. The mean weight of the tubers placed in the pots was 0.84 gm and the mean weight of those harvested was only 0.44 gm. Tuber weight did not correlate with the number of tubers per pot ($r = -0.08, p = 0.42$) and the reduction in mean weight may be due either to harvest before the end of the growing season or to growing in pots.

MANAGEMENT IMPLICATIONS

This study indicates that most of the tested herbicides would significantly reduce nutsedge during fallowing or cover-crop. Except for Roundup Ultra Max or Oust, doubling the herbicide more than doubled the reduction in nuts at harvest. The reduced effectiveness of Roundup Ultra Max if irrigated (or rained on) within a half hour of application should be noted. Given that most treatments did not differ significantly, except Reflex, criteria such as cost and environmental impact ("friendliness") are probably the most important considerations in selecting among these herbicides for control outside the seedling crop.

Table Mean weights and numbers of nutsedge tubers and of foliage per pot by herbicide treatment 151 days after 10 tubers were planted and 131 days after herbicide application†.

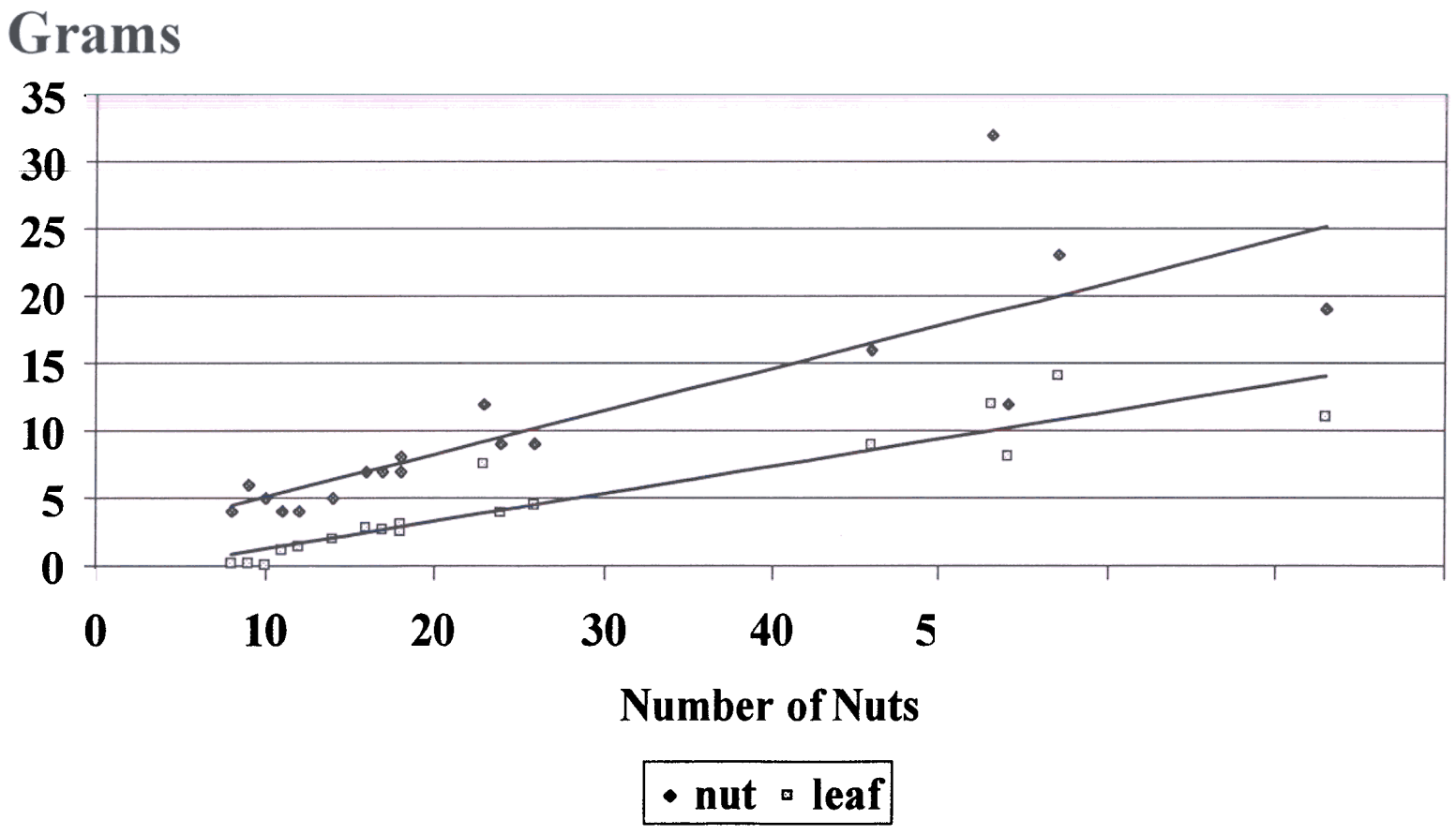
Rank•	Treatment	Lbs ai / Ac	Pints A / Ac	Grams leaf	Grams "Nuts"	Nut Number
20	Control	-		28	101	201
12	Roundup Pro	2.5	6	7.5	12	23
3	Roundup Pro	4.1	10	0.0	5	10
	Roundup Ultra Max	1.6	4	2.5	8	18
9	Roundup Ultra Max	3.3	8	3.1	8	18
15	Roundup Ultra Max§	1.6	4	8.9	16	46
16	Roundup Ultra Max§	3.3	8	12	32	53
7	Ultra Max +	3 +	8 +	2.8	7	16
	Reflex	0.75	3			
18	Reflex	0.34	1.5	14	23	57
19	Manage	0.03	0.04		19	73
10	Manage	0.06	0.08	2.5	7	18
13	Manage	2 @ 0.03	0.04	3.9	9	24
	Manage	2 @ 0.06	0.08	0.2	4	8
14	Finale	13	10	4.5	9	26
5	Oust	0.02	0.03	1.4	4	12
2	Oust	0.04	0.06	0.2	6	9
7	Outrider	0.04	0.05	8.1	12	54
6	Outrider	0.08	0.10	1.9	5	14
4	Outrider	0.12	0.16		4	
8	Eptam	6.1	7	2.6	7	17
			Lsd	6.5	18	28

†) The Eptam treatment was soil incorporated before tubers were planted and all other herbicides were applied to foliage on May 24.

•)Rank refers to number of nutsedge tubers at harvest where Rank 20 is most.

§)Treated foliage received a simulated 0.5 inches of rain 30 minute after herbicide was applied.

Figure 1. Correlations between numbers of nuts and weights of leaves and of nuts by herbicide treatment for the data in Table 1



Data for controls left out