

## THE EFFECTIVENESS OF EPTAM IN CONTROLLING WEEDS IN SOUTHERN FOREST NURSERIES

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Weed control is one of the most important economic problems in southern forest tree nurseries. Even though mineral spirits (Stoddard's Solvent) successfully controls most weeds, a few species, such as nutgrass (Cyperus spp.) and ragweed (Ambrosia spp.), are resistant. A gradual increase in these resistant weeds skyrockets the cost of control because of increased hand weeding labor required. This increase in cost of hand weeding is often high enough to justify the use of chemical controls. The need for a herbicide to control nutgrass, ragweeds, and other troublesome weeds at a reasonable cost has been recognized by southern nurserymen for a number of years.

A preliminary screening program in 1958 using several herbicides showed Eptam to be a promising chemical for use in southern nurseries. In 1959, a large-scale test was conducted at the Morgan Nursery of the Georgia Forestry Commission near Byron to assess the value of Eptam for weed control. This report gives the results of the 1959 tests.

### Materials and Methods

On April 6, 1959, Eptam was applied with sprinkling cans at 5 and 10 pounds of active material per acre in 50 gallons of water per 1,000 square feet. A disk harrow was used to incorporate the material into the soil. Six nursery beds (each 4 x 500 feet) were subdivided into plots 6 beds wide by 125 feet long and subplots 3 beds wide by 25 feet long with 4 replications per Eptam treatment. A split plot factorial design compared the following variables:

1. Fumigated and unfumigated pine straw cover. Methyl bromide was used at one pound per cubic yard to fumigate the straw and kill any weed seed.
2. Mineral spirits spray and none. Mineral spirits (Stoddard's Solvent) was applied at identical rates and frequencies used on the remaining portions of the nursery.
3. Eptam dosage at 5 and 10 pounds per acre.
4. Double (preplanting and postplanting) applications of Eptam. The postplanting application was made 2 months after the preplanting application in 5 gallons of water per 100 square feet followed by <sup>1</sup> inch of water applied by the irrigation system.

Loblolly pine (Pinus taeda L.) was seeded to four of the six beds on April 15, 1959, and slash pine (Pinus elliotii Engelm.) to the remaining two beds on April 16, 1959. Thus each subplot was planted with two beds of loblolly and one bed of slash pine.

Numbers of weeds were counted in two 4-square-foot areas of each bed in each subplot. These counts were made at four biweekly intervals beginning May 14. The area was hand weeded after each count.

<sup>1</sup>Eptam (ethyl di-n-propylthiolcarbamate) used in this experiment was supplied by Stauffer Chemical Company, Mountain View, Calif. This study was conducted in cooperation with the Georgia Forest Research Council.

At the end of the growing season, seedlings from a 1- x 4-foot area were lifted from each bed in each subplot and graded in accordance with Wakeley's morphological grades (Wakeley, 1954).

## Results and Discussion

Eptam reduced the total weed population from 25 to 16 weeds per square foot, and mineral spirits significantly reduced the total weed population from 25 to 4 weeds per square foot (table 1).

TABLE 1.--Total number of weeds per square foot of bed space counted within 80 days after treatment

Treatment	No mineral spirits	Mineral spirits	Total
Check.....	25.44	4.18	29.62
Eptam @ 5 lbs./acre.....	18.70**	1.44**	20.14
Eptam @ 5 lbs./acre plus 5 lbs./acre postplanting..	17.30**	1.16**	18.46
Eptam @ 10 lbs./acre.....	16.74**	.70**	17.44
Eptam @ 10 lbs./acre plus 10 lbs./acre postplanting	16.04**	.64**	16.68
Least significant difference at 1 percent level....	3.50	1.43	

\*\*Significant at 1 percent level.

Mineral spirits reduced the population of most weed species found in the area. Eptam also reduced weed populations except in the case of Digitaria (table 2). The combination of Eptam and mineral spirits virtually eliminated all weeds from the area and the need for hand weeding.

TABLE 2.--Total number of weeds by species counted within 80 days after treatment per square foot of bed space

Treatment	Crabgrass ( <u>Digitaria sanguinalis</u> (L.) Scop.)		Nutgrass ( <u>Cyperus rotundus</u> L.)		Mexican clover ( <u>Richardia scabra</u> St. Hil.)		Miscellaneous species	
	O <sup>1</sup>	MS <sup>2</sup>	O <sup>1</sup>	MS <sup>2</sup>	O <sup>1</sup>	MS <sup>2</sup>	O <sup>1</sup>	MS <sup>2</sup>
Check.....	14.71	3.53	3.15	0.06	6.29	0.16	1.29	0.43
Eptam @ 5 lbs./acre.....	14.73	1.32**	.76**	.02**	2.75**	.04	.46**	.06
Eptam @ 5 lbs./acre plus 5 lbs./acre postplanting	13.24	1.08**	.25**	---**	2.96**	.06	.85**	.02
Eptam @ 10 lbs./acre.....	14.13	.64**	.14**	---**	1.91**	.02	.56**	.04
Eptam @ 10 lbs./acre plus 10 lbs./acre postplanting.....	14.67	.56**	---**	---**	1.15**	.06	.22**	.02
Least significant difference at 1 percent level.	NS	1.18	.47	.03	.47	NS	.21	NS

<sup>1</sup> O - No mineral spirits applied.

<sup>2</sup> MS - Mineral spirits applied.

\*\* - Significant at 1 percent level.

There were no significant differences between unfumigated and fumigated straw cover treatments. This indicates that there were few weed seeds brought in with the straw cover.

No significant difference was found between the 5 and 10 pounds per acre treatments (table 1), nor was there any beneficial effect of the second application of Eptam. However, it should be noted that while the total number of weeds in the 10-pound treatment with mineral spirits is not significantly different from zero weeds, the number in the 5-pound treatment is significantly different.

Pine seedling growth was stunted with all concentrations of Eptam used. Significantly fewer plantable and more cull seedlings were found in all Eptam treatments than in the check (table 3). No significant difference of the stunting effect of Eptam was found between slash and loblolly pine. No adverse effect on pine seedlings was noted at 6 and 12 pounds of Eptam per acre in a North Carolina nursery (Hodges, 1960). The delayed planting for 2 weeks after treatment and the Wickham fine sandy loam on which the North Carolina test was conducted may have been the responsible factors for such a difference of results. The present study was conducted on a Magnolia sandy loam soil and was planted 9 days after treatment.

The cost of Eptam is presently \$4 per pound, a total cost of from \$20 to \$40 per acre for material and application. The amount of mineral spirits required per acre could possibly be reduced enough to offset the additional cost of Eptam if the two were used for weed control.

TABLE 3.--Effects of Eptam on pine seedling growth. The data are representative of 1 square foot of bed space

Treatment	Plantable seedlings (Grades 1 and 2)		Cull seedlings (Grade 3 and cull)	
	Number	Weight in grams <sup>1</sup>	Number	Weight in grams <sup>1</sup>
Check.....	45.2	346.7	3.8	7.8
Eptam @ 5 lbs./acre.....	42.9*	309.6**	5.0*	10.8**
Eptam @ 5 lbs./acre plus 5 lbs./acre postplanting.....	43.4	323.7**	5.1*	9.5
Eptam @ 10 lbs./acre.....	34.8**	231.7**	9.3**	18.2**
Eptam @ 10 lbs./acre plus 10 lbs./acre postplanting.....	35.8**	252.2**	11.5**	24.0**
Least significant difference:				
1 percent level.....	2.77	17.62	1.35	2.77
5 percent level.....	2.07	13.19	1.01	2.07

<sup>1</sup> Fresh weight measurements.

\*\* Significant at 1 percent.

\* Significant at 5 percent.

## SUMMARY

In a large scale weed control experiment established in April 1959, Eptam reduced the population of all species of weeds in the experimental area to a point that with the addition of mineral spirits the percent kill was virtually 100 percent. Approximately 94 to 96 percent kill was obtained with 5 pounds per acre, and 97 to 98 percent with 10 pounds per acre when combined with mineral spirits. Results from a single preplanting application of Eptam were not improved by a post-application 2 months later.

Approximately 4 months of excellent weed control was obtained with the combination of Eptam and mineral spirits.

## Literature Cited

Hodges, C. S. 1960. Effect of soil fumigation in the nursery on growth of loblollypine seedlings and control of weeds. Tree Planters' Notes 42:23-27.

Wakeley, P. C. 1954. Planting the southern pines. U.S. Dept. Agr., Agr. Monograph 18, 233 pp., illus.