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SICKLEPOD CONTROL WITH TOXAPHENE IN LOBLOLLY PINE NURSERIES

By

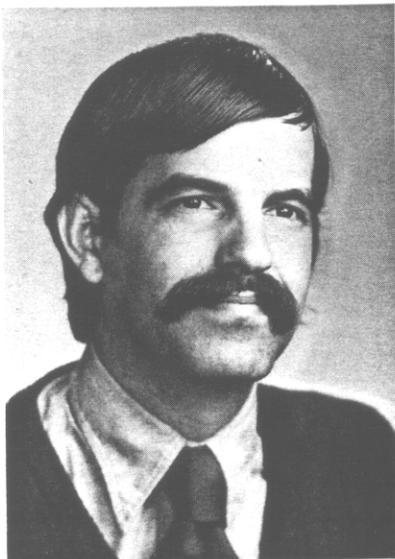
DAVID B. SOUTH AND DEAN H. GJERSTAD



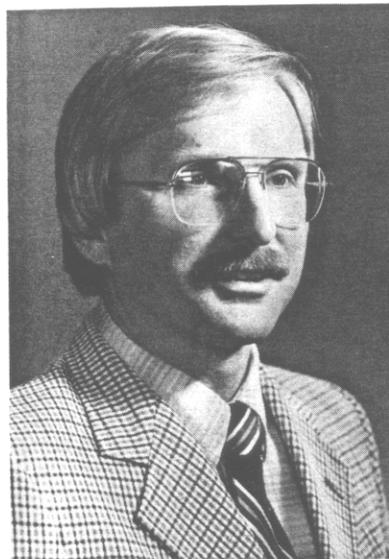
RESEARCH DIVISION

GEORGIA FORESTRY COMMISSION

AUTHORS



David B. South is Assistant Professor in the Forestry Department at Auburn University, Auburn, Alabama. He received his B.S. and M.S. degrees from North Carolina State University. He is Director for the Auburn University Southern Forest Nursery Management Cooperative.



Dean H. Gjerstad is Associate Professor of Forestry at Auburn University. He received his B.S., M.S. and Ph.D. degrees from Iowa State University. He is Director for the Auburn University Silvicultural Herbicide Cooperative.

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DAVID B. SOUTH AND DEAN H. GJERSTAD

INTRODUCTION

Sicklepod (Cassia obtusifolia L.) has been reported to be the most troublesome weed at three Georgia forest nurseries while four other nurseries in Georgia indicated that it was a moderate weed problem. This non-nodulating legume is a summer annual and can grow up to seven feet tall in one year. It grows well under a wide range of soil and environmental conditions and is a prolific seed producer. Sicklepod grows particularly well under the optimum growing conditions existing in fertile, moist nursery seedbeds. Methyl bromide fumigation does not control sicklepod but in fact often is followed by prolific germination of sicklepod. This is likely a direct result of warm soil temperatures -- optimum for germination is be-

between 75° and 100°. Nurserymen often refer to sicklepod as coffeeweed, however this common name is incorrect since coffeeweed (Daubentonia texana Pierce.) is a different species.

Sicklepod seed populations increase at nurseries where plants are allowed to go to seed in ditch banks, riserlines and cover crop areas (Figure 1). The cover photograph illustrates the enormous population which can occur at a forest nursery where sicklepod is allowed to reproduce. However, sicklepod infestations can be reduced by rotating to cover crops in which effective herbicides can be used. Control can be achieved with continuous corn for three or four years using soil treatments of Sutan+ (butylate) with

atrazine, or atrazine alone followed by timely cultivations and foliar directed sprays of either Lorox (linuron), Evik (ametryn), paraquat or 2,4-D. However crop rotations at most forest nurseries consist of only one or two consecutive years of cover crops which may not be adequate to control sicklepod. Therefore, a selective herbicide is needed to control this weed in pine nurseries.

Toxaphene is effectively used to control sicklepod in soybeans and peanuts. Its use in forest nurseries has been primarily for insect control. The results reported here arise from a research project funded by the Georgia Forestry Commission to investigate the tolerance of loblolly pine seedlings to toxaphene.

Table 1. Loblolly seedling density, average height, and injury resulting from toxaphene treatments.

Treatment	Rate lb ai/A	Morgan Nursery			Great Southern Nursery			Georgia Kraft Nursery		
		Seedlings per. sq. ft.	Average Height (in)	Injury*	Seedlings per. sq. ft.	Average Height (in)	Injury	Seedlings per. sq. ft.	Average Height (in)	Injury
Toxaphene	2+2	7	12.8	0	---	---	---	22	8.3	0.7
Toxaphene	2+2+2	---	---	---	13	9.4	0	---	---	---
Toxaphene	4+4	5	14.2	0	---	---	---	22	8.8	1.0
Toxaphene	4+4+4	---	---	---	15	9.3	0	---	---	---
Control	0	6	15.7	0	15	8.2	0	24	8.8	0.7

*Visual injury: 0=No injury; 10=complete kill.

Materials and Methods

Study 1

The study was conducted at the Georgia Forestry Commission's Morgan Nursery near Byron, Georgia. A complete block design with four replications was used. Plot size for toxaphene treatments was 80 by 6 ft. Prior to sowing, the experimental area was fumigated with methyl bromide (33% chloropicrin) at a rate of 400 lb/A. The area was sown April 21, 1981, and mulched with ground newspaper. A preemergence application of Goal (oxyfluorfen) at 0.5 lb ai/A was applied to the entire area on April 23. Sicklepod began to emerge soon after planting and was treated on May 20 with 0, 2, and 4 lb ai/A of toxaphene plus crop oil as a crop oil concentrate. The nursery sprayer equipped with 8006 Teejet nozzles was calibrated for 50 gallons/acre. The area was treated again at the same rates on May 29, and an evaluation of sicklepod control was made on June 4. All plots were treated with postemergence herbicide applications consisting of oxyfluorfen at 1 lb ai/A on June 30 and Modown (bifenox) at 2 lb ai/A on July 9. Seedling heights, densities and injury ratings were taken in January 1982.

Study 2

A second study with the same experimental design was conducted at the Great Southern Nursery near Cedar Springs, Georgia. Plot size was 6 by 100 ft. Prior to sowing, the experimental area was fumigated with 360 lb/A methyl bromide (2% chloropicrin). The area was sown on April 15, 1981 and mulched with hydro-mulch. No preemergence herbicide was

used. The first application of toxaphene was applied on June 9 at 0, 2, and 4 lb/A plus 1 qt/A of Agridex (a surfactant and crop oil blend). The nursery sprayer (with 8004 Teejet nozzles) was calibrated for 26 gallons/acre. The treatment was applied even though no sicklepod was present. The second and third applications of toxaphene were applied on June 19 and 30, respectively. Seedlings were evaluated for height, density and injury in January 1982.

Study 3

A third study with the same experimental design was conducted at the Georgia Kraft Nursery near Buena Vista, Georgia. Plot size was 6 by 100 ft. Prior to sowing, the experimental area was fumigated with 365 lb/A methyl bromide (33% chloropicrin). On April 23, 1981 the area was sown, treated with 0.75 lb/A oxyfluorfen and mulched with sawdust. Sicklepod soon began to emerge and was treated on May 22 with 0, 2, and 4 lb ai/A of toxaphene plus 1 qt/A of Agridex. The nursery sprayer equipped with 8004 Teejet nozzles was calibrated for 20

gallons/acre. A postemergence application of oxyfluorfen at 0.5 lb ai/A was applied to the entire area on May 24. A second application at the same rates of toxaphene was applied on June 8. Seedlings were evaluated for height, density and injury in October.

Results and Discussion

Table 1 shows pine seedling numbers and heights and injury ratings for the three nurseries. Toxaphene did not cause injury to loblolly at any location. The weed control obtained was good at all nurseries (less than 28 man-hours per/acre). However no sicklepod was observed at the Great Southern Nursery. At the remaining nurseries, control of sicklepod with toxaphene ranged from 75 to 90% (Table 2). The recorded 20 to 52% control on the check plots may or may not be attributed to the preemergence application of oxyfluorfen, however a preemergence application of oxyfluorfen does not normally control sicklepod.

Timing of application and sufficient coverage are very important for effective

Table 2. Weed Control of Sicklepod with Toxaphene

Treatment	Rate lb ai/A	% Sicklepod Control		
		Morgan Nursery	Georgia Kraft Nursery	Kraft Nursery
Toxaphene	2	---	---	82
Toxaphene	2+2	75	---	---
Toxaphene	4	---	---	85
Toxaphene	4+4	90	---	---
Control	0	20	---	52

FIGURE 1



FIGURE 2

FIGURE 3



control. Since cotyledon stage sicklepod (Figure 2) is easiest to control, best results can be obtained when application is made soon after emergence. Because the cotyledon leaves close at night, application should be made during the day.

Since sicklepod will germinate throughout the growing season, it is unlikely that one application will give season long control. Toxaphene provides good control of young emerged sicklepod (Figure 3), but subsequent applications are needed for late germinating seed. For this reason, two to three consecutive applications on

a 7-10 day schedule may be needed.

The recommended rate of toxaphene is 2 to 3 lbs ai/A for each application. The addition of a nonphytotoxic crop oil surfactant concentrate with a ratio of approximately 80-20, 85-15 or 83-17 oil to surfactant is recommended. The nursery sprayer should be calibrated to apply 20-40 gallons of water per acre.

Recently, EPA has cancelled most uses of toxaphene. However, certain existing stocks of cancelled toxaphene products can be used up under this order until December 31, 1986.

CONCLUSION

Results from this study indicate that toxaphene will control sicklepod without injuring loblolly pine seedlings. Although toxaphene is selective in controlling sicklepod, this should not be the only method of control employed in forest nurseries. Sicklepod control in pine nurseries requires a combination of cultural,

mechanical and chemical methods. The nurseryman should never allow sicklepod plants to go to seed in the cover crops, fallow areas, riserlines or seedbed areas. Five to seven years of a combined sanitation and chemical control program can greatly reduce the sicklepod problem in forest nurseries.



A. Ray Shirley, Director
John W. Mixon, Chief of Forest Research

Cost	\$1,827
Quantity	5,000