PHOSFON-D RETARDS HEIGHT GROWTH OF BLACK LOCUST

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A new chemical, Phosfon-D [1], used by some florists to retard stem elongation and increase stem diameter, may be useful to tree nurserymen. Some hardwood seedlings become too large for convenient handling after only one growing season. Seedling size can be influenced by pruning, fertilizing, bed density, sowing date, and watering schedules, but none of these is completely satisfactory. The new chemical was tried on black locust (Robinia pseudoacacia L.), a fast-growing species. It significantly[2] retarded height growth of black locust in pots, but was somewhat less effective in a nursery trial.

In the pot study, black locust seed was sown in gallon cans containing 0.0, 2.5, 5.0, and 10.0 grams of Phosfon-D per cubic foot of potting soil. Four replications of each concentration of retardant were arranged in a Latin square and placed under artificial light for 9 weeks. Phosfon-D very effectively retarded both height and stem-diameter growth of black locust seedlings (table 1). Seedlings grown in the highest concentration of Phosfon-D, 10.0 grams per cubic foot of soil, were only half as tall as those grown in untreated soil (fig. 1). Root length and the formation of nodules were not affected. But seedlings grown in untreated soil had more fibrous roots than those grown in treated soil.

Figure 1.--Phosfon-D retarded height growth of black locust seedlings.

1 Tributyl-2,4-dichlorobenzylphosphonium chloride developed by the Virginia-Carolina Chemical Corporation. Results reported do not constitute an endorsement of this product.

2 Differences among treatments were statistically significant at the 1-percent level.

TABLE 1.--Effects of Phosfon-D on the development of black locust seedlings

POT STUDY

Amount of Phosfon-D per cubic foot of soil (grams)	Stem height	Stem diameter	Root length	Nodules present
	Inches	*32d inch*	*Inches*	*Percent*
0.0	11.4	2.6	8.3	62
2.5	10.0	2.6	7.8	88
5.0	6.2	2.2	7.2	38
10.0	5.1	2.1	9.2	62

NURSERY STUDY

0.0	14.9	4.1	7.3	66
2.5	14.3	4.3	7.5	75
5.0	14.1	4.4	6.2	52
10.0	13.4	4.5	7.8	69
100.0	10.3	4.6	7.5	66

In the nursery study, conducted at Indiana's Clark _State Nursery, black locust seedlings were grown in five concentrations of Phosfon-D (0.0, 2.5, 5.0, 10.0, and 100.0 grams per cubic foot of soil) randomly assigned to five 4- by 5-foot plots in each of four blocks. The chemical was thoroughly mixed into the top 1 foot of soil in 3-foot-square areas centered within the plots. The seed was sown June 10.

Nine weeks after sowing, differences in height growth among treatments were apparent. Three weeks later, however, the differences were disappearing, possibly because the Phosfon-D was leaching out. At the end of the growing season 25 seedlings randomly selected from a 2-foot square centered in the treated 3-foot square, were measured to evaluate treatments. There was a little difference in height growth among treatments: seedlings grown in the highest concentration of Phosfon-D, 100 grams per cubic foot, were more than 3 inches shorter than those grown in untreated soil (table 1). In contrast to results from the pot study, stem diameter of nursery-grown seedlings increased as the amount of Phosfon-D increased. It appears quite likely that other factors, such as seedbed density, may have offset or at least obscured the effects of Phosfon-D on stem diameter. Root length and the occurrence of nodules were not affected by Phosfon-D.

If a more effective way of using Phosfon-D in the nursery can be found it will give nurserymen another tool for controlling the size of some species. Since Phosfon-D does not retard height growth of all flower species, it will probably not retard the growth of all woody plants. Therefore, the chemical should not be used on other species until proved effective experimentally.