

TREATMENT OF FOREST-TREE SEED WITH CHEMICAL PROTECTANTS

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Tree seeds, like seeds of other plants, also have many potential enemies, both fungi and bacteria which inhabit the soil. These destructive agencies commonly destroy an appreciable portion of the planted seed. Successful measures to combat these losses would save considerable quantities of high-priced seed.

Each year additional chemical seed protectants appear on the market and the number of species that can be successfully treated has increased. Such treatment accomplishes two results. It kills fungus spores carried on the seed and establishes a zone of protection around the seed as it germinates, minimizing attack by soil-borne organisms.

Treatment of seed prior to planting has shown particular merit for seeds that have a high germinative capacity but have been weakened by long storage or by other causes. Such treatment also assumes added importance for seeds sown in soil harboring high populations of pathogenic fungi. It has been demonstrated, as the result of widespread tests on vegetable and crop seeds, that certain fungicides are best suited to seeds of particular species. Seeds of different species differ in their susceptibility to injury by various fungicides.

During 1951 and 1952 a small experiment was initiated to determine the effectiveness of one of the many seed fungicides on forest-tree seeds. Seeds of three species of softwoods were dusted with Arasan and planted during the fall (1951) and spring (1952) planting seasons. Results were as follows:

1 / The field work on this project was carried out by Nurserymen H. E. Staley and Carl Snyder and Senior Forester John E. Ewers. The author planned the

	<u>Seedlings per square foot</u>		<u>Increase in survival of</u>
	<u>Treated</u>	<u>Untreated</u>	<u>treated seed</u>
	<u>(number)</u>	<u>(number)</u>	<u>(percent)</u>
Hemlock	344	240	43
Northern spruce	336	228	47
Red pine	140	120	17

project.

These results were encouraging. All species treated showed a marked increase in germination as compared with untreated seedlings. For Norway spruce the increase was 47 percent.

In the spring of 1953 additional plots in two forest-tree nurseries were established and treated with two commercial preparations, Arasan 2/ and Spergon. 3/ Seeds of several species were dusted with these two seed protectants, according to the manufacturer's recommendations for vegetable seeds of similar size. Results are presented in Table 1.

Table 1. --Effect of seed fungicide treatment on forest-tree seed

Location and species	Seedlings per sq. ft. treated with Arasan <u>1/</u>		Check	Increase or decrease in survival	Seedlings per sq. ft. treated with Spergon <u>1/</u>		Check	Increase or decrease in survival
	Plot 1	Plot 2			Plot 1	Plot 2		
	No.	No.			No.	No.		
<u>Clearfield Nursery:</u>								
White pine	34	48	43	+5.1	46	58	35	+33.0
Chestnut	16	15	25	-18.4	16	12	13	-26.3
<u>Mont Alto Nursery:</u>								
White pine	42	54	47	+1.9	60	55	60	+7.5
Red pine	50	57	67	-15.7	60	81	60	+11.0
Nor. spruce	186	154	146	+8.6	198	192	167	+24.6

1/ Rate: For chestnut seed, 1/3 teaspoon per pound of seed; for other species, 1 teaspoon per pound of seed.

The 1953 treatments failed to duplicate the outstanding increases in seedling survival experienced in the single trial with Arasan in 1952. In the later trials, however, double the amount of Arasan (1 teaspoon per pound) was used in treating the same species. Injury due to excessive amount of protectant may have been the cause.

These two small-scale tests conducted during 1952 and 1953 indicate that additional research is warranted to evaluate the possible advantages of treating forest-tree seed with protectants. Two questions must be answered: What fungicide is best suited for each individual species of tree seed, and how much should be applied for consistently favorable results.

To accomplish this, future research should test the most promising seed protectants with various amounts for the various species of forest-tree seeds.

2/ 50 percent tetramethylthiuramdisulphide.. E. I. DuPont de Nemours & Co.

3 / 90 percent tetrachloro-para-benzoquinone. United States Rubber Co.