

# PHYTOACTIN DOES NOT IMPROVE SURVIVAL OF STORED MONTEREY PINE AND DOUGLAS-FIR SEEDLINGS

RONALD S. ADAMS, SAMUEL F. GOSSARD, and JOHN R. RITCHEY 1

Phytoactin, a polypeptide antibiotic, has been used to help control pathogens. It also has been used for the control of white pine blister rust (*Cronartium ribicola* Fisher) in the Intermountain Region on a test basis (1, 2). Tests using phytoactin were unsuccessful in controlling blister rust in sugar pine <sup>2</sup> and western gall rust (*Peridermium harknessii* Moore) in Monterey pine <sup>3</sup>. Kahler <sup>4</sup> reported that dipping multiflora rose seedlings in a 1,000 p.p.m.

1 Respectively, Forester III, Regeneration Silviculturist, State Forester's Staff, Sacramento; Forester II, Manager, the Parlin Fork Nursery; John R. Ritchey, Forester II, Manager, Ben Lomond Nursey.

<sup>2</sup> Personal correspondence with Robert V. Bega, February 1966.

<sup>3</sup> Personal correspondence with Daniel D. Dotta, February 1966.

<sup>4</sup> Kahler, L. H., Rep. to Jack Ziffar, Director, Microbiological Res., Pabst. Lab., Milwaukee, Wis.

phytoactin solution reduced mold during winter storage.

Based on the Kahler report, the California Regional Office of the U. S. Forest Service suggested that phytoactin might prevent mold in conifers during cold storage in State and Federal forest nurseries. A sample of phytoactin L-455 for a study in State nurseries was furnished by Pabst Laboratories, Milwaukee, Wis.

Monterey pine (*Pinus radiata* D. Don) exhibits little dormancy during the winter shipping season, and the seedlings' tender stems and foliage are susceptible to fungus infection when packaged, especially if packed wet. Douglas-fir (*Pseudotsuga menziesii* (Mirb) Franco), although much more resistant, has some liabilities if packed and stored fairly long.

TABLE 1.—*First year survival of 1-0 Monterey pine planting stock treated with phytoactin, stored in refrigeration and planted at the Ben Lomond Nursery.*

Treatment	Storage in Weeks					LSD <sup>1</sup> for Storage		
	0	2	4	8	Mean	@ .01	@ .05	
	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	
No phytoactin -----	94	92	90	35	78	27	20	
Phytoactin treated -----	92	88	72	19	68			
Mean -----	92	90	81	27	—	19	14	
LSD for phytoactin								
@ .01 -----	-----27-----					—		
@ .05 -----	-----20-----					10		

<sup>1</sup> LSD indicates least significant difference.

### The Experiment

A phytoactin antibiotic study on Monterey pine was conducted at the California Division of Forestry's Ben Lomond Nursery (Santa Cruz County), on Douglas-fir at the Parlin Fork Nursery

(Lendocino County). The Ben Lomond Nursery produces 500,000 to 750,000 1-0 Monterey pine seedlings each year, and the Parlin Fork Nursery furnishes about one million 2-0 Douglas-fir seedlings. The following variables were tested for seedlings of both species:

(1) Amount of phytoactin-control and tops dipped in 800 p.p.m. (12 fluid ounces of L-455 in 10 gallons of water).

(2) Lengths of storage-0, 2, 4, and 8 weeks.

The study was started in late January 1964. Seedlings were nursery-run 1-0 Monterey pine and 2-0 root-pruned Douglas-fir. Fifty seedlings of both species were put into each of 40 bundles. Bundles were randomly assigned to the phytoactin treatment and to control and to storage periods. The tops of bundled seedlings given phytoactin were dipped in solution for 15 seconds and drained. The roots then were wrapped in wet Tuflex, and the bundles were packed in polycoated kraft bags.

As cold storage (33°-35° F.) periods were completed, seedlings were immediately planted, using a "Little Beaver" auger. Plantings were made in a randomized block with five replications. The plots were periodically hand hoed to keep them free of competing vegetation.

### Results

As Monterey pine seedlings were removed from storage after the assigned periods, those from no storage and 2 and 4 weeks' storage, treated and untreated, all appeared in good condition. However, after 8 weeks, four bundles that had been treated contained one to five trees each with moldy tops or mold near the root collars. Two bundles that did not receive phytoactin had 3 and 12 trees with moldy tops, respectively.

No top mold was evident on Douglas-fir for any of the storage periods. Survival results for Monterey pine and Douglas-fir are shown in Tables 1 and 2, respectively.

The following results for Monterey pine are evident: (1) there was no significant interaction between phytoactin treatment and storage periods; (2) there were no significant differences in survival between phytoactin treated and untreated seedlings

TABLE 2.—*First year survival of 2-0 Douglas-fir planting stock treated with phytoactin, stored in refrigeration and planted near the Parlin Fork Nursery.*

Treatment	Storage in Weeks				
	0	2	4	8	Mean
	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
No phytoactin -----	67	56	71	71	66
Phytoactin treated -----	70	41	61	49	55
Mean -----	68	48	66	60	—

through the four storage periods; (3) the phytoactin treated seedlings stored for four weeks did not survive as well as those not stored; (4) after 8 weeks storage, mortality for both treated and untreated seedlings was significantly greater to a high degree than for 4 weeks or less; and (5) mean survival of phytoactin treated seedlings was significantly less than 'untreated ones.

Apparently there were some uncontrolled variables that confounded results of the Douglas-fir test. Results shown in table 2 indicate no significant differences between individual storage or phytoactin treatments or between treatment means. However, it appears that the phytoactin treatment may have been detrimental to 8-week stored stock.

Two rather obvious conclusions can be drawn from this study:

1. Monterey pine seedlings should not be stored for 8 weeks.
2. Phytoactin did not improve survival of either Monterey pine or Douglas-fir stored seedlings.

#### Literature Cited

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