BUD BREAK OF DOUGLAS-FIR SEEDLINGS NOT DELAYED BY SPRING TREATMENT WITH TMTD OR ALAR

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Chemically delaying vegetative bud break on nursery stock could be advantageous. A delay of a week or two might avoid late-spring frost damage to tender shoots or gain more favorable conditions for lifting seedlings. Delayed lifting in spring would also reduce the need for storage facilities. Delaying bud break until other vegetation had sprouted might reduce browsing by animals on shoots of newly planted seedlings.

This was prompted by bud break appearing to be delayed in nursery beds of Douglas-fir seedlings treated with TMTD [2] rabbit repellent. However, direct comparisons with untreated seedlings of identical seed source were usually lacking. Since TMTD is combined with Rhoplex AC-33 [3] adhesive, these chemicals were tested together and separately. Also included was a very limited trial of ALAR; a growth-retardant chemical that delays fruit bloom of pears when applied the preceding fall (1).

Methods

Several hundred 2-0 Douglas-fir seedlings (seed source: Willamette National Forest, 5,000-foot elevation) were lifted from under 2 feet of snow on March 16, 1966, at the Wind River Nursery, Forest Service, near Carson, Wash. Seedlings were brought to Corvallis, Oreg., in polyethylene bags and placed in a cooler at 35° F. On March 22, they were sorted and divided into 14 bundles of 15 seedlings each. The tops of the seedlings contained in two randomly selected bundles were dipped in each of the following seven water-based formulations: [5]

1. Control (distilled water) .
2. TMTD (5 percent, in Arasan 42-S [6]) and Rhoplex AC-33 adhesive (7 percent by volume).
3. TMTD (2.5 percent) and adhesive (3.5 percent) .
4. TMTD (5 percent) plus Tide detergent (0.03 percent by weight) as a surfactant.
5. TMTD (2.5 percent) and detergent (0.015 percent) .
6. Rhoplex AC-33 adhesive (7 percent by volume).
7. ALAR-50W [7] (0.4 percent acid by weight).. This commercial preparation includes a surfactant.

The roots of each bundle of seedlings were protected in a polyethylene bag, and the tops were dipped for 30 seconds to the crown base in the assigned treatment. After draining briefly, seedlings were laid on paper to allow the treated tops to dry

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2 Active ingredient, tetramethylthiuram disulfide.

3 AD acrylic resin adhesive manufactured by Rohm & Haas

4 N-dimethyl amino succinamic acid. Commercial names include ALAR, B-NINE, and B-995.

5 Since dipping results in a substantially heavier application of chemical than spraying (2) , the 10-percent TMTD and adhesive concentrations were arbitrarily reduced to more closely approximate amounts applied by sprayer.

6 TMTD is manufactured by E. I. duPont de Nemours & Co.

7 Manufactured by U.S. Rubber Co.

at room temperature. Seedlings were then potted individually in cans of soil. The cans' were buried in an open field in two groups, with 15 seedlings representing each treatment randomly located within each group.

The loss of chemical was minimized by not wetting the foliage during watering; also, no rainfall occurred for 17 days after outplanting.

Daily observations were made for bud break, the criterion being the breaking of needle tips through the covering of either the terminal or a lateral bud. Statistical comparisons of resulting data were made by analysis of variance.

Results

No treatment delayed the average bud break date significantly, either statistically or practically (table 1). The average day for bud break of the control seedlings was April 25, and the maximum delay in average bud break for treated seedlings was less than 2 days. Dates for the earliest seedling in each treatment to break bud also differed by a maximum of only 2 days from the control. Lateral buds broke earlier than terminals in the majority of seedlings, but not invariably so (3).

Delaying bud break by spring applications of the TMTD or ALAR formulations tested was not promising. Application in the fall or earlier in the spring might prove more effective, but then the nurseryman would have to choose much earlier the stock to treat. Potential advantages of controlling bud break make trials of other treatment or chemicals desirable.

TABLE 1.—*Average delay in bud break related to control seedlings*

Dip treatment	Days[1]
1. Control (water)	0
2. TMTD (5 percent) plus adhesive (7 percent)	.8
3. TMTD (2.5 percent) plus adhesive (3.5 percent)	1.1
4. TMTD (5 percent) plus detergent (0.03 percent)	.8
5. TMTD (2.5 percent) plus detergent (0.015 percent)	.5
6. Adhesive only (7 percent)	.1
7. ALAR-50W (0.4 percent)	1.7

[1] Data based on 30 seedlings per treatment except for treatment 3, which is based on 29.

Literature Cited

(1) Griggs, W: H., Iwakiri, B. T., and Bethell, R. S.
1965. B-NINE fall sprays delay bloom and increase fruit set on Bartlett pears. Calif. Agr. 19 (11) : 8-11, illus.

(2) Radwan, M. A.
1965. Determining minimum amounts of TMTD rabbit repellent needed to protect Douglas-fir planting stock. Tree Planters' Notes 70: 16--20.

(3) Sweet, G. B.
1965. Provenance differences in Pacific coast Douglasfir. Seed and seedling characteristics. Silvae Genet. 14: 46-56.