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CHEMICAL BASAL TREATMENT TO CONTROL RED ALDER

By

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A key to better restocking of conifers on recently cutover forest land in the Oregon Coast Range is the elimination of competition from red alder (Alnus rubra Bong.). This can be readily accomplished with a foliage spray containing 2, 4-dichlorophenoxyacetic acid (2, 4-D). 2/ Tests in 1954 and 1955 on the Cascade Head Experimental Forest have shown that control is also possible using a basal application of 2, 4, 5-trichlorophenoxyacetic acid (2, 4, 5-T).

Alder quickly becomes established on cutover forest land, particularly along creeks, and on tractor roads, truck roads, and landings. It encroaches on benches and flats and sometimes on steep slopes where it was not even a minor component of the stand before logging. Because of rapid initial height growth, alder overtops conifer seedlings on these areas and soon dominates the site. Even planted conifers are readily overtopped.

Foliage spray from the air is recommended for control on large areas. However, the many individual alder trees or small groups not

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1/ Willamette Research Center, Corvallis, Oregon. Maintained in cooperation with the School of Forestry, Oregon State College. Acknowledgment is gratefully made to R. N. Raynor, Dow Chemical Company, for technical advice and supplying chemicals.

2/ Hawkes, Carl. Planes release tree plantation. Jour. Forestry 51: 345-348. 1953.

large enough for efficient aerial application of foliage spray are best controlled using ground methods, either foliage or basal. Basal treatments seem best for trees over 15 feet tall. Unlike foliage sprays, basal treatments can also be used during the dormant season when control work can be correlated with planting and when adequate labor is usually available.

The Cascade Head basal treatment study was in a 6-year-old alder stand where tree diameters ranged from 1 to 6 inches, and heights averaged about 20 feet. Chemicals were sprayed on the lower 12 inches of the stems for trees up to 3 inches in diameter. Larger trees were treated to a height equal to four times the diameter of the tree. Each stem was thoroughly wetted on all sides until some chemical ran down around the root crown. Equipment was a backpack pressure spray can equipped with a horseshoe-shaped adapter (fig. 1).

An 8-percent concentration of 2, 4, 5-T in diesel oil 3/ was used in the main test. A 4-percent solution of 2, 4, 5-T in diesel oil and a combination of 2, 4, 5-T plus 2, 4-D were tested on a more limited scale. Formulations were propylene glycol butyl ether esters. Treatments were replicated on 3 plots, each containing 20 tagged trees. All treatments were made in clear weather when stems were dry.

A very high percentage of kill was obtained for all chemicals and concentrations. Foliage generally started to curl within 2 weeks after treatment, and defoliation was almost complete before the end of the first growing season. At that time the cambium immediately under sprayed sections of bark was brown and apparently dead, but cambium above the treated section was still green on most trees. Some trees leafed out in the spring of 1955 and then died. When all sprayed trees were examined in September 1955 (15 to 17 months after treatment), 96 percent of the trees in all treatments were dead (table 1), and there was no resprouting. The 4 percent still alive are largely defoliated. Five of the 6 surviving trees in the April treatment will probably continue to live. Two trees survived the June treatment of 2, 4, 5-T plus

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3/ Solutions were prepared by mixing 3.2 pints of concentrate with enough diesel oil to make 5 gallons. This concentration is 8 percent by volume of concentrate or 32 pounds acid per hundred gallons. Since the formulation used contained 4 pounds acid equivalent per gallon, the concentration by weight of acid was 4.3 percent or 43,000 parts per million.

Figure 1.--Equipment used for basal treatment to kill red alder. (F.S. Photo 476826)

2, 4-D, but are expected to die. Four trees survived the 4-percent 2, 4, 5-T treatment in late June, but 2 are expected to die.

All dead stems were still standing 15 months after treatment, but there were signs of rapid deterioration. Almost full sunlight penetrated to the forest floor through the dead branches (fig. 2).

Costs were $0.044 per tree using the 8-percent concentration of 2, 4, 5-T. Production per man-hour was 90 trees. In treating 90 trees, 2 gallons of solution were used. Cost breakdown per tree was:

Item	Cost
Labor	$0.022
Oil	.004
2, 4, 5-T	.018
Total	$0.044

Table 1.--Kill of alder by basal treatment

Date treated	Date examined	Chemical	Concentration 1/	Kill			
				Plot A	Plot B	Plot C	Average
			Percent			Percent	
April 15, 1954	September 28, 1955	2, 4, 5-T	8	95	90	85	90
June 2, 1954	do.	2, 4, 5-T	8	100	100	100	100
June 28, 1954	do.	2, 4, 5-T	8	100	100	100	100
June 28, 1954	do.	2, 4, 5-T	4	100	100	80	93
June 28, 1954	do.	2, 4-D + 2, 4, 5-T	4	100	95	95	97

1/ By volume of concentrate.

A

B

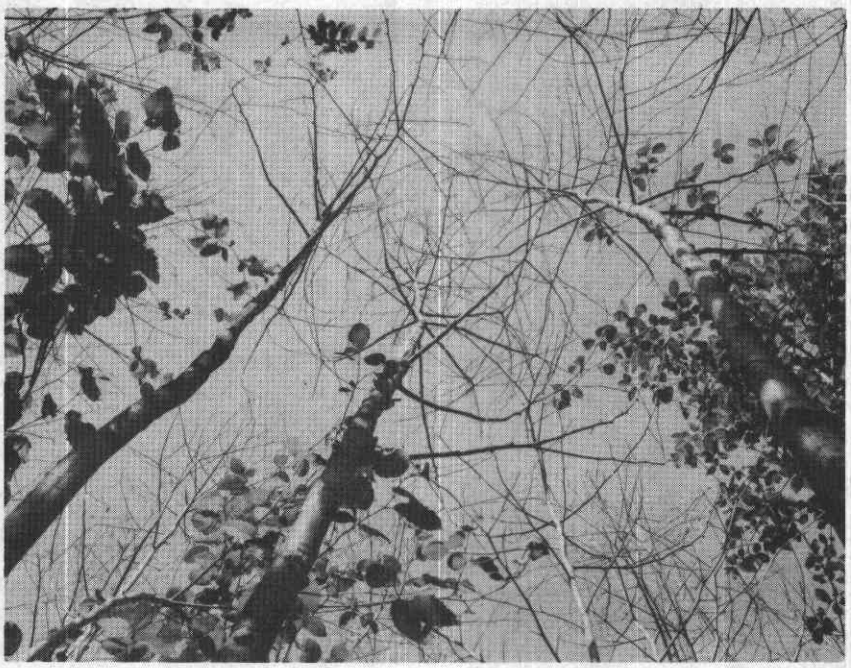

Figure 2.--Six-year-old alder stand treated with chemicals by basal method. A, At time of treatment (F.S. Photo 476821). B, Fourteen months after treatment, trees were completely defoliated and dead. Live foliage is on untreated trees.

Using the 4-percent concentration of the 2, 4, 5-T plus 2, 4-D mixture reduced the cost to $0.031 per tree, which approximates cost of hand slashing and girdling. 4/ Chemical control, however, apparently has the advantage of preventing resprouting.

Further research is planned to determine effects of basal treatments during the dormant season, during wet weather, with lighter concentrations of chemical, and with other formulations. By pinpointing the most effective chemical and concentration, it is expected that costs can be reduced substantially.

4/ See footnote 2, page 1.