

Aircraft Spraying of Blue Oak

phenoxy herbicides found most effective when applied in May for three successive years, followed by ground-rig cleanup

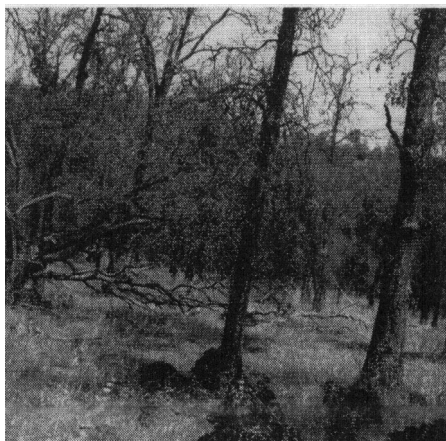
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Conversion from brush to forage land may be aided by a broadcast spray that can kill most of the woody plants.

Proper timing, choice of chemical, and reapplication are the important factors in the control of blue oak and woody brush. Additional spraying by ground-rig is usually needed to clean up the surviving woody growth.

Blue oak—*Quercus douglasii*—occurs on several million acres of California grazing lands, sometimes in pure stands but more often accompanied by other species of woody plants. Removal of woody plants is a recognized range improvement practice, to increase forage and improve the watershed. Previous work in California showed a fivefold increase in forage production and an increase in the palatability to livestock of forage growing where blue oak trees had been killed by 2,4-D amine, using the surface-cut method. More specific information is needed to evaluate the economics of clearance. It is anticipated that the benefits of clearance will diminish after the nutrients released from killed trees have been utilized by forage plants.

To study the effect of single and repeat applications of several phenoxy compounds on the blue oak and accompanying species of woody plants, an experiment was undertaken near Sutter Creek. Some points studied were the relative effectiveness of 2,4-D—2,4-dichlorophenoxyacetic acid; 2,4,5-T—2,4,5-trichlorophenoxyacetic acid; 2-(2,4-DP)—2-(2,4-dichlorophenoxy) propionic acid; and 2-(2,4,5-TP)—2-(2,4,5-trichlorophenoxy) propionic acid—in amine and in ester compounds—propylene glycol butyl ether esters; season of application; and repeat treatments.



Plot sprayed with 2-(2,4,5-TP) in May, 1955, in June, 1956, and in May, 1957. Photo taken in July, 1959. Manzanita and most of the blue oak are dead.

Blue oak; interior live oak—*Quercus wislizenii*; poison oak—*Rhus diversiloba*; and digger pine—*Pinus sabiniana*—were the most common woody plants in the plot area. In addition, there was some scattered manzanita—*Arctostaphylos* sp.; wedge-leaf ceanothus—*Ceanothus cuneatus*; and buckeye—*Aesculus californica*.

Two pounds per acre of chemical—acid equivalent—in 10 gallons of a 1.5:8.5 oil-water emulsion were applied by spraying. Hydrogen-filled balloons were used in flagging. Swaths were 35' wide. The treatments were unreplicated 4-acre plots. Results in control of blue oak and poison oak are given in the table.

Timing of application of the sprays was probably more important in determining kill of woody plants than was the type of chemical. Applications in May were far more effective than those in June. The only exception appears to have

been in a three-year program where 90% of the blue oak was killed by 2-(2,4,5-TP) applied in May, 1955, in June, 1956, and again in May, 1957, but only 67% of the blue oak was killed in plots sprayed with that same chemical in May for three years in a row. It appears that sprays are most effective when applied as soon as possible after the leaves reach full size.

Phenoxypropionic esters were clearly superior to phenoxyacetic esters against blue oak, and 2-(2,4-DP) appeared superior to 2-(2,4,5-TP). However, considering brush control as a whole, 2-(2,4,5-TP) was much the better chemical. 2,4,5-T was considerably inferior to 2-(2,4,5-TP) against blue oak and somewhat inferior against poison oak. 2,4-D was the least effective of the chemicals tested against blue oak. The results of the amine treatments are not shown in the tables, because the percentage kills were very low.

Plots sprayed with 2-(2,4,5-TP) ester showed the best over-all control of woody plants—mainly blue oak and poison oak. In addition, those plots became more attractive to cattle. Even four years after the initial application, stock tended to congregate there. Animals were not attracted to other treatment plots to the same extent, probably because the total reduction in woody growth was less in the other plots.

Digger pine tolerated three applications of 2-(2,4,5-TP) with little or no injury, suggesting that this chemical might be useful for controlling brush selectively in pine forests.

Some of the results which seem to favor spraying are that cattle utilize the area better; that many weeds are controlled by the sprays; and that more water should become available, both for stock use and as an underground reserve, both on and off the treated property. The valuable results could be made more or less permanent by a program of complete brush eradication, and fire—which opens up a site to the re-establishment of brush and weeds—would no longer be necessary.

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Control of Blue Oak and Poison Oak by Single and Repeated Airplane Applications of Phenoxy Herbicides (Esters). Readings in May, 1959.

Dates of spraying			Percent of blue oak trees killed				Relative kill of poison oak ¹			
1955	1956	1957	2,4-D	2,4,5-T	2,4-DP	2,4,5-TP	2,4-D	2,4,5-T	2,4-DP	2,4,5-TP
May 10			2	5	19	20	10	10	10	10
May 10	May 10		7	5	35	34	7	6	10	2
May 10	June 8		2	6	28	37	10	10	10	10
May 10		May 15	15	20	72	50	7	4	10	3
May 10	May 10	May 15	9	35	..	67	5	3	..	2
May 10	June 8	May 15	90	3
June 10			2	0	2	5	10	10	10	10
June 10	June 8		0	3	..	10	10	10	..	10

¹ Rating of 1 represents complete control, 10 no control.