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PACIFIC NORTH WEST FOREST AND RANGE EXPERIMENT STATION

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REPEATED SPRAYING TO CONTROL FOUR COASTAL BRUSH SPECIES

by

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ABSTRACT

Resprouting salmonberry, western thimbleberry, vine maple, and California hazel shrubs were readily controlled by a respray of 2,4,5-T applied as an early foliar treatment. A respray of amitrole-T or picloram did not appreciably increase degree of control compared with the initial application.

KEYWORDS: Herbicides, (- brush control, silvicultural control, salmonberry, thimbleberry, vine maple, California hazel.

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Research and field experience during the past 20 years have proven herbicidal sprays to be an effective method for controlling competing shrubs and weed trees on forest lands in the Oregon and Washington Coast Ranges. However, silvicultural use of herbicides is complicated and requires careful selection of chemical, dosage, and carrier. Proper selection of treatments for the variety of brush conditions found on coastal sites requires knowledge of individual species' response to herbicides to accurately predict the results of selected treatments.

Information is available for single applications of herbicides on major species that compete with conifers (Krygier and Ruth 1961, Stewart 1974a, 1974b), but many species resprout and are not adequately controlled by one application. Repeated applications are often required to achieve the desired degree of control. To assess desirability of respraying, foresters must know the effects of successive applications of herbicides on these species. At present, this information is available only for southwest Oregon brush species (Gratkowski 1968). The tests reported here provide the same information for four major shrub species found on forest lands in the Coast Ranges.

MATERIALS AND METHODS

During 1970, selected formulations of herbicides were tested as early foliar and midsummer sprays on six of the most common brush species on forest lands in the Oregon Coast Ranges (Stewart 1974b). Each herbicidal treatment was applied as a foliage spray to drip point using knapsack sprayers. Sprays were applied on 10 individual shrubs of each species in a completely randomized design. Red alder (*Alnus rubra*) trees less than 12 feet (3.6 meters) high proved highly susceptible to herbicides and were readily killed with one application; salal (*Gaultheria shallon*) was resistant to all herbicides tested. The remaining four species, salmonberry (*Rubus spectabilis*), western thimbleberry (*Rubus parviflorus*), vine maple (*Acer circinatum*), and California hazel (*Corylus cornuta* var. *californica*) were intermediate in response. Surviving shrubs of these species sprouted from stems and roots the following year.

In May 1972, resprouting shrubs in the original plots were again sprayed with the same formulations of herbicides. Only the most effective treatments from the 1970 tests were included in the respray treatments. These tests were designed to determine the cumulative degree of control resulting from repeated early foliar applications of herbicides.

Herbicides[1/] used were:

Herbicide	Formulation
2,4,5-T [(2,4,5-trichlorophenoxy) acetic acid]	Propylene glycol butyl ether ester
Silvex [2-(2,4,5-trichlorophenoxy) propionic acid]	Propylene glycol butyl ether ester
Amitrole-T [a 1:1 mixture of 3-amino-*s*-triazole and ammonium thiocyanate]	Water-soluble liquid
Picloram [4-amino-3,5,6-trichloropicolinic acid]	Potassium salt

The herbicide 2,4,5-T was applied in a 3-percent diesel oil-in-water emulsion on salmonberry and western thimbleberry shrubs and in water on vine maple and California hazel. All other herbicides were applied in water carriers.

[1/] Test samples of 2,4,5-T, silvex, and picloram were provided by The Dow Chemical Company; Amchem Products, Inc. provided the amitrole-T. This cooperation is appreciated.

Shrubs resprouting after the original early foliar and midsummer applications were resprayed during the early foliar season when three-fourths of the leaves of all four brush species were fully developed and plants were actively growing. This period is generally regarded as optimum for applying herbicides as foliage sprays. Treatment effects were evaluated during September of 1973, 16 months after the resprays were applied. This examination indicated that all four species could be adequately controlled for site preparation or release of small conifers by two applications of the most effective herbicides. Therefore, additional resprays on the remaining live shrubs were not necessary, and the study was terminated.

RESULTS AND DISCUSSION

Cumulative plant kill resulting from early foliar or midsummer sprays on mature shrubs and early foliar resprays on resprouting shrubs is shown in table 1. Resprays of 2,4,5-T were very effective on most species, especially at the lower rates of application. In many cases, the second application at least doubled the number of plants killed. This agrees with previous results for southwest Oregon species that indicate resprouting shrubs are easier to kill than full-crowned mature plants (Gratkowski 1968).

Table 1.--*Cumulative percentage of shrubs killed by repeated sprays on mature (1970) and resprouting (1972) brush species*

Species and herbicide	Concentration	Carrier	Early[1/] foliar spray, 1970	Early[1/] foliar respray, 1972	Midsummer spray, 1970	Early[1/] foliar respray, 1972
	lb aehg		--------*Percentage of shrubs killed*----------			
Salmonberry:						
2,4,5-T	3	Emulsion	50	90	40	100
Amitrole-T	1	Water	70	70	70	70
	3	Water	80	80	70	80
Picloram	1	Water	70	90	100	--
Western thimbleberry:						
2,4,5-T	3	Emulsion	50	90	60	90
Amitrole-T	1	Water	10	20	0	0
	3	Water	20	50	0	30
Picloram	1	Water	70	100	80	90
Vine maple:						
2,4,5-T	1	Water	0	20	0	20
	3	Water	40	80	30	80
Silvex	1	Water	10	30	0	50
	3	Water	30	50	30	60
Picloram	1	Water	40	80	30	80
California hazel:						
2,4,5-T	1	Water	20	80	10	50
	3	Water	60	100	40	80
Silvex	1	Water	40	70	0	10
	3	Water	10	70	20	60
Picloram	1	Water	80	100	70	100

1/ When 3/4 of the leaves were fully developed.

Resprays of picloram, highly effective on mature plants, were justified only on vine maple. However, a respray of the less expensive herbicide 2,4,5-T produced results equivalent to that obtained with picloram.

A respray of amitrole-T had little effect on western thimbleberry and did not increase control of salmonberry. Such sprays would only tend to hasten conversion of salmonberry-western thimbleberry communities to western thimbleberry. In contrast, a respray of 2,4,5-T 1 or 2 years later would virtually eliminate both species. These results show that one foliage spray of 2,4,5-T may not adequately control well-established mature salmonberry shrubs. On the other hand, small seedlings or succulent resprouting shrubs should be very susceptible. Therefore, early recognition of a developing brush problem is critical if we are to reduce the need for resprays.

For conifer release, the objective is to increase the amount of light reaching young conifers and reduce shrub competition for soil moisture and nutrients (Gratkowski 1961). It is usually necessary only to obtain a high percentage of defoliation, a fair amount of topkill, and a minimum of resprouting. For brushfield reclamation, however, a high percentage of the shrubs must be killed and resprouting must be limited. Control adequate to release well-established conifers can be obtained with one spray of 2,4,5-T on red alder less than 12 feet (3.6 meters) high, salmonberry, western thimbleberry, vine maple, and California hazel (Stewart 1974b). For releasing small conifers or for reclamation, a second spray of 2,4,5-T should produce adequate control of salmonberry, western thimbleberry, vine maple, and California hazel. A single application of picloram, a nonselective herbicide, may be adequate for site preparation or reclamation on these species.

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Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key--out of reach of children and animals--and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first-aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the Federal Environmental Protection Agency, consult your county agricultural agent or State extension specialist to be sure the intended use is still registered.

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