2. That the first spray be applied early in the season and that the mixture contain a minimum of 3 lb. acid equivalent of a polypropylene glycol butyl ether ester or a butoxyethanol ester of 2,4-D per 100 gal. of water at a minimum rate of 100 gal. per mile ($2\frac{1}{2}$ to 3 acres).

3. That the second application be made by July 1 and contain 2 lb. of 2,4-D, and 1 lb. of 2,4,5-T.

4. That the third spray be applied before September 1 and contain 3 lb. of 2,4-D.

5. That the equipment be prequalified 1,000-gal. sprayers.

6. That after a three-year period only one application per year be made.

7. That trained crews and accurate amounts of material be used and that wind, atmospheric conditions, and susceptible vegetation be considered.

8. That, prior to spraying, the areas should be investigated and that slopes subject to erosion should not be sprayed. Likewise, desirable vegetation should be designated not to be sprayed.

9. That spraying and mowing operations be coordinated and a fertilizing program be included.

10. That when cattle claims arise, close coordination be the rule with the State University and with the Department of Agriculture, especially the Veterinary Division.

11. That all damage claims should be investigated.

12. That no opportunity be overlooked to promote good public relations. Publicity should stress safety, economy, and efficiency.

OREGON'S HERBICIDE PROGRAM

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The Oregon State Highway Department is confronted with a dual problem in the control of vegetation on its rights-of-way. First, it is concerned with the control of vegetation that is detrimental to drainage areas, obstructs sight distance, or otherwise interferes with the operation and maintenance of highways. Second, it is obligated by law to control vegetation that has been declared noxious to agricultural crops, although these species may actually be of benefit in controlling erosion on highway slopes.

Prior to introduction and use of translocated herbicides, undesirable vegetation had to be removed by costly hand methods. In the moist western section of the state regrowth and natural reseeding of trees and shrubs were vigorous, normally requiring recutting within a five-year period. Consequently, the introduction of herbicides which could be utilized to eradicate unwanted vegetation through mechanized operations was welcomed. Their use, first on an experimental basis and then more generally, was successful in killing vegetation, but, through overzealousness and lack of experience of operators, criticism of the method was received from the public. A restudy of the value and use of herbicides on highway rights-of-way was made and a basic policy formulated and adopted.

Simply stated, Oregon's maxim is: "Cut, then spray." Spraying of green foliage in excess of 3 feet in height is prohibited except in the species of poison

ak, gorse, and blackberries. The use of selective herbicides is also prohibited long roadsides bordered by homes, vegetable or flower gardens, and, during the rowing season, along fields of agricultural crops susceptible to spray damage. praying is done selectively to preserve desirable native shrubs such as salal, uckleberry, Oregon grape, and rhododendron.

Three other control measures also were instigated. A letter was sent to all arden clubs in the state belonging to the Oregon Federation of Garden Clubs, stating the spraying policies of the Highway Department and pointing out the effectiveess of the method, the necessity of controlling the growth of trees and shrubs, nd the dollar savings possible through the use of herbicides. It also acknowledged hat a minimum of brown foliage was a corollary to this method, but was a transiory stage which would result in an improved appearance of the roadsides.

In recognition of the need for specialized training of spray operators, a ourse of instruction has been held during the past two years for maintenance peronnel engaged in the spraying work. The State Department of Agriculture and the xtension Service of Oregon State College have cooperated generously in providing echnically trained personnel to conduct the instruction. The program consists of one-day session on the use of herbicides, application methods, and safety precauions, followed by a written examination covering the general subject. No employee no fails to make a passing grade is permitted to operate spraying equipment along regon highways without the supervision of an employee who has passed the examinaion satisfactorily.

The third measure was the employment of an agronomist to supervise the proram of herbicide application, to provide the necessary technical information, and o test and evaluate new chemicals as introduced for the elimination or control of egetation. These measures have been satisfactory to the point that no complaint as received during 1955 regarding the herbicide control program.

Most of the spraying along state highways is done by state maintenance forces. n addition, the State Highway Commission has authorized the Department to enter nto cooperative agreements with counties or weed-control districts whereby they do praying on highway rights-of-way on a reimbursible cost basis. This arrangement as been satisfactory generally, avoids unnecessary duplication of men and equipent, and removes the possibility of criticism that correct methods are not being mployed by highway forces. It has resulted in better public relations and has een economical for the Department. Conversely, it solved only the problem of oxious weeds and did not solve the problem of unwanted shrubs or tree growth.

The Highway Department makes use of both foliage and stump sprays for control undesirable brush species. The foliage spray consists of low-volatile ester ormulations of 2,4-D and 2,4,5-T or mixtures thereof at the rate of 4 lb. acid quivalent in 100 gal. of water. The stump, or dormant, spray consists of lowolatile ester formulations of 2,4-D and 2,4,5-T in diesel oil at a concentration 16 to 24 lb. of acid equivalent in 100 gal.

For control of noxious weeds a spray consisting of 2,4-D low-volatile ester is enerally used at a concentration of 2 to 4 lb. in 100 gal. of water. In certain gricultural areas of the state where there is a possibility of damage to susceptie crops the amine formulation is used rather than the ester.

For sterilization of soils around guard rails, sign posts, and bridge heads, e Highway Department uses chlorate borate mixtures and Telvar W and DW. Applicaons of chlorate borates are generally made in the spring before the end of the iny season at rates of 2 to 4 lb. per 100 sq. ft. Telvar W applications are made

in sections of Oregon east of the Cascade Mountains at the rate of 25 to 30 lb. per acre with re-treatments made as needed. Telvar DW applications are made in the spring in the higher-rainfall areas of western Oregon at the rate of 40 lb. per acre.