Cut-surface applications of herbicides provide satisfactory control of tanoak and madrone, eliminating competition with Douglas-fir.

Control of hardwoods improves Douglas-fir growth

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Evergreen broadleaf trees, such as tanoak (*Lithocarpus densiflorus* [Hook & Arn] Rehd.) and madrone (*Arbutus menziesii* Pers.), infest almost a million acres, or 25 percent, of potentially productive redwood/Douglas-fir timber acreage in northern California and southwestern Oregon. The cut-surface method of injecting herbicides into the vascular systems of such undesirable tree species is an effective means of control. Recent interest in this method of hardwood tree control in forests can be attributed to several factors. One is the relatively poor long-term control of resprouting species provided by herbicide applications from aircraft. Another is that the cut-surface method increases selectivity; the user can treat only the trees he wishes to control, such as those of one species or size, leaving desirable trees. Cut-surface applications also confine the herbicide to the treated tree.

Tree control study

The stems of tanoak and madrone growing as overstory to small Douglas-fir were treated by the cut-surface method in April 1964. Herbicides used were the amines of 2,4-D and 2,4,5-T and the potassium salt of picloram.

Cuts were made through the bark into the wood at the bases of 3- to 4-inch stems severing all the bark around the tree. No attempt was made, however, to connect separate cuts, since the objective was to sever the vertical lines of flow. Cuts were horizontal, so that the herbicide could not run out, once placed in the cut. Each cut received approximately 5 ml of undiluted 2,4-D, 2,4,5-T, or picloram. All tanoak and madrone were cut-surfaced in each 2,500-square-foot treatment area. Therefore, the number of Douglas-fir and treated hardwood trees varied. A nontreated area was also included for comparison.

In August 1974, stems of surviving and dead tanoak, madrone, and Douglas-fir were counted. In addition, radius cores at diameter breast height (d.b.h.) were obtained with an increment borer from all living Douglas-fir.

Results

Satisfactory control of both hardwood species was achieved by cut-surface application of all herbicides tested (87, 79, and 94 percent control for 2,4-D, 2,4,5-T, and picloram, respectively). However, in each treatment, some tanoak survived because of stem recovery rather than seedling establishment.

Three Douglas-fir died in the picloram-treated area. Since picloram is known to seep from roots of treated plants, root leakage from treated trees and subsequent uptake by Douglas-fir may account for the mortality.

Tree basal areas of Douglas-fir 15 years or older were compared. Trees less than 15 years old were excluded, because at the time of treatment they were either nonexistent or very small and were subjected to competition from larger trees of the same species. Douglas-fir basal growth averaged 1.1 inches where tanoak and madrone overstory was not controlled. Douglas-fir receiving the benefit of overstory tree control had significantly larger basal areas. Basal area growth was increased by 260, 451, and 405 percent 10 years after treatment with 2,4-D, 2,4,5-T, and picloram, respectively, to remove tanoak and madrone overstory. Competition among the Douglas-fir themselves explains the growth differences between the 2,4-D and other herbicide treatments. Hardwood tree control with proper Douglas-fir thinning may realize even greater production increases than this study suggests.

Conclusion

It is apparent that tanoak and madrone growing in association with Douglas-fir can seriously reduce the growth of that timber species. Since both broadleaf species existed as an overstory, shade removal might account for increased Douglas-fir growth in treated plots. Furthermore, increased moisture or nutrient availability as a result of broadleaf tree control is also possible.

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New project

Insects attacking stored products

Accurate identification of pest species at different stages of life is an important guide to effective control of insects and mites that cause serious post-harvest losses of food, seeds, fiber, and animal and lumber products. No single text now provides a means to identify these pests. The objective of this project is to prepare a comprehensive, easily understood, illustrated manual for the identification of stored product insects, and to improve methods of evaluating losses. Project leader is W. W. Middlekauff, U.C., Berkeley. (ENT 3801)