DWARF MISTLETOE CONTROL
ON THE ROGUE RIVER NATIONAL FOREST IN OREGON

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Abstract: Dwarf mistletoe treatment strategy is reviewed for clearcuts, shelterwoods, and uneven-aged management areas on the Rogue River National Forest in southwest Oregon. Stand cleaning is not attempted in old-growth stands, but is instead concentrated at the time of regeneration cutting, with some follow-up stand cleaning in young stands. Administration requires data gathering that is location oriented and job specific, with a good record keeping system. Each unit manager should be held responsible for the effectiveness of the dwarf mistletoe control program on his unit.

Key words: Dwarf mistletoe, stand cleaning, regeneration cutting, clearcuts, shelterwood, uneven-aged management.

INTRODUCTION

The Rogue River National Forest is one example of a Pacific Northwest dwarf mistletoe situation. A considerable amount of control work has been done, and the results look promising.

The Rogue River National Forest contains about 621,000 acres of land in extreme southern Oregon and northern California on the west slope of the Cascades and the northern part of the Siskiyou Mountains. The center of the Forest is about 100 miles inland from the Pacific Ocean, so the climate is essentially warm and moist in the winter, but hot and dry in the summer.

About 80 percent of the Forest is managed for some type of commercial wood production. The average elevation of these lands is 4,300 feet, with extremes as low as 1,800 feet and as high as 7,000 feet elevation.

We are blessed by 10 major timber species of conifers, principally Douglas-fir (Pseudotsuga menziesii), white fir (Abies concolor), Shasta red fir (Abies magnifica var. shastensis), ponderosa pine (Pinus ponderosa), sugar pine (Pinus lambertiana), western white pine (Pinus monticola), and some western hemlock (Tsuga heterophylla). But at the same time, we are cursed by 5 species of dwarf mistletoe, sometimes up to 3 species on the same acre. By far the worst in terms of virulence and damage on this Forest are Douglas-fir (Arceuthobium douglasii) and hemlock dwarf mistletoe (A. tsugense).

We have some kind of dwarf mistletoe problem on approximately 75 percent of the Forest, but using the guidelines I will describe, we have cleaned about 100,000 acres from dwarf mistletoe.


To understand what we have done, and what is still unfinished, one must first know something about the overall timber management cycle from old-growth, to plantation, to pole stand, to mature timber.

No stand cleaning is attempted in old-growth stands. The first dwarf mistletoe treatment in mature stands is a regeneration cut to remove all the excess trees, prepare the site, and start a new plantation.

As the plantation grows, it is pre-commercially thinned at about age 15 to leave the best 320 trees per acre. At about age 40, the average stand will receive a commercial thinning to remove the excess trees and leave the best. Thereafter, a light thinning will be done every 15 years until the stand is mature at about age 85. At that time the stand will be regenerated again with a new plantation.

In review, many old-growth stands are heavily infected with dwarf mistletoe. We make no attempt to clean these stands by partial cutting. The best chance to rid an area of dwarf mistletoe happens only once every 90 years, during the regeneration cut. We feel that if we bungle this opportunity, chances are we will have condemned the land to another 85 years of infection with all the associated growth losses, mortality, etc.

Therefore, the regeneration cut is where our major effort is placed. With some subsequent stand cleaning during future entries, we feel the program will be successful.

OPPORTUNITIES FOR DWARF MISTLETOE CONTROL DURING REGENERATION CUTTING

Each type of regeneration cutting requires a somewhat different treatment approach.

Dwarf Mistletoe Control in Clearcuts

In clearcutting, all the trees on a block of land are cut at once. After disposal of the slash, usually by burning, the area is reforested clean of dwarf mistletoe. Our job is to keep it clean by removing sources of reinfection.

Using Douglas-fir as an example, reinfection can occur if any infected Douglas-fir residual whips or seedlings are left in the area after cutting and burning. These must all be cut, injected, or otherwise killed. When the tree dies, so does the mistletoe. Even though these trees often contain some usable wood, they must be killed. If they can be utilized in some way, such as for fuelwood, fine. But any wood lost is likely to be insignificant in comparison with the damage reinfection could cause.

A second source of infection in clearcuts is from the surrounding uncut timber. There are several treatment options.

1. In mixed species stands, log out the infected species at least a chain or more back into the timber, so dwarf mistletoe seeds cannot pop out into the new plantation. With good planning this chain wide strip can often be included in the sale and logged at the same time as the clearcut, or

2. If it is not possible to remove infected edge trees before planting, they should be removed before the susceptible seedlings reach 3 feet in height or 10 years of age, whichever occurs first, or

3. Where it is not possible to move the infection edge away from the susceptible seedlings, then the susceptible seedlings must be moved away from the timber. A strip extending about 100 feet into the plantation should be reforested with a tree species not susceptible to that species of dwarf mistletoe. In some cases it may be necessary to remove susceptible natural seedlings which become established in the strip.

Dwarf Mistletoe in Shelterwoods

Shelterwood is another system used to regenerate a timber stand. Shelterwood cutting on the Rogue River National Forest is usually done in blocks, some as small as 10 acres, and some as large as 700 acres. In this type of cut the canopy is rather uniformly opened by logging, while leaving sufficient trees to provide seed and shelter for a new crop of seedlings.

When the plantation is well established, the remaining overstory trees are removed, either in a series of cuts or all at once, depending on the physical situation at each site. Where frost protection is a major consideration, the overstory may have to be left for long periods of time, even up to 40 years.
In block shelterwoods, reinfection of the plantation can be prevented in several ways:

1. Remove all the trees of the infected species the first cut. For instance, if Douglas-fir is infected, and Douglas-fir is to be used for reforestation, leave no Douglas-fir overstory trees in the overstory. Select leave-trees only from species other than Douglas-fir, or

2. Remove the infected overstory species shortly after the susceptible species in the plantation are established, before the seedlings reach 3 feet in height or before they reach 10 years of age, whichever occurs first.

Recognize that some infection will probably occur, and that all subsequent thinnings will require careful stand cleaning wherever infection centers are found. In this case, it is helpful to mark the stumps of the infected overstory trees so the potential infection centers can be identified later.

It is also helpful to use a broad mix of native tree species in the plantation. This helps to prevent the rapid spread of dwarf mistletoe seeds from tree to tree. It also makes it possible to clean out an entire group of trees of the infected species, and still have sufficient trees of other species to stock the spot, or

3. Shift the species composition of the plantation to some less susceptible species. For instance, if Douglas-fir is infected in the overstory, plant pine underneath, or white fir, or whatever species fits the site.

The problem is that Douglas-fir will surely seed in, and those seedlings might become infected. However, Douglas-fir can be discriminated against during precommercial thinning and commercial thinning so as to keep it a minor component of the stand. And assuming that a good job was done in establishing the other species in the plantation, the losses in the Douglas-fir will be a minor part of total stand production.

4. In all cases, protect the perimeters of shelterwood plantations from infections in the surrounding timber, as discussed in the section on clearcuts. After overstory removal, shelterwoods look like clearcuts anyhow, so the same guidelines apply.

Dwarf Mistletoe Control in Uneven-aged Management Areas

Uneven-aged management is a silvicultural system that carries trees of all sizes on the same acreage, without any massive regeneration cut at any one time. Instead, a few trees of each size class or a small group of trees are cut on some periodic re-entry cycle, such as every 15 years. The holes created are reforested, and the stand tends to remain about the same through time.

Uneven-aged management is suited to certain special situations such as campgrounds, scenic highway strips, important stream sides, sensitive trails, unstable landslide areas, and areas of poor site or extreme reforestation difficulty.

Dwarf mistletoe control in uneven-aged situations is very difficult, though not entirely hopeless. The stand situations favorable to dwarf mistletoe propagation are all present. A source of infection is always available in the older trees. There is plenty of sunlight. And there are always younger trees to become infected and carry on the disease.

It might sometimes be possible to remove all the trees of the infected species, and install a clean plantation of the susceptible species. But this alternative will seldom be possible because of the light cuts inherent to uneven-aged management and because so many of the infected trees are smaller than merchantable size.

Generally, the only strategy we have available for uneven-aged stands is some type of species manipulation within the timber stand.

This could be done by planting immune species underneath the infected stand, and discriminating against the susceptible species until all the susceptible trees are gone in that portion of the stand. When there is no remaining source of infection, the susceptible species can be reintroduced into the cleaned area by planting.
If dwarf mistletoe is spotty, then only the infection centers need such treatments. But if the infection is widespread, then a species shift would be necessary in the whole block.

If several species of dwarf mistletoe exist on the same acre, it may be impossible to clean all the species at once. Instead, the manager may have to decide which dwarf mistletoe species he is going to eradicate and which he is going to ignore for the present.

ADMINISTRATION

In closing, let me describe some problems we are having in hope that others might be able to avoid them or solve them.

1. Dwarf mistletoe surveys, or careful walk-throughs, or whatever is used to identify dwarf mistletoe problems, should be location oriented. Building a large volume of coded plot cards will expend the funds, but may not accomplish anything if they are lost in the storeroom or in a computer bank someplace. We want maps with specific locations and work orders so we can go out and get the needed work done.

2. A good record keeping system is needed showing what has been done and what needs to be done in the future. Do your records show what is to be done, where, when and why? Could a stranger figure it out, or do you have to be there to explain it?

3. Record keeping systems must be capable of prompting future actions. As an example, how will the land manager 20 years from now be prompted to make a careful inspection and sanitize the dwarf mistletoe infected Douglas-fir trees in the south 1/2 of unit 217? If your system does not provide for this type of prompting for future actions, the benefits of any dwarf mistletoe actions taken now will probably dribble away in time.

4. The effectiveness of a unit's dwarf mistletoe control program should be made a part of every manager's performance rating.

Someone must be charged with the responsibility for getting the job done. To date, in most organizations, the managers have been made aware of what needs to be done, and they are encouraged to proceed. But if they don't happen to take an interest, or they decide it's not important, nothing happens. They can still get high ratings for civil rights, and getting out the cut, etc., and move on up the promotion ladder, but leave a dwarf mistletoe mess behind them that no one can straighten out later.

So in the process of growing up, the technique of dwarf mistletoe control has passed its infancy. We now know what to do, and have a pretty good idea how to do it. The program has matured. It is now time to demand accomplishment, and not just give it lip service.