

Management Strategies— Case Studies

Forest-Site Planning and Prescription for Control of Annosus Root Disease in Ponderosa Pine and Mixed Conifer Stands¹

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Abstract: In order to successfully combat € pathogens such as annosus root rot, the land € manager and pathologist must have periodic € dialogue about the pest, its identification, € effects, impacts, and cures. The author € presents four important topics to structure this € dialogue. These are (1) training from the € pathologist to the silviculturist or other land € manager, (2) site specific input, by the € pathologist to silvicultural prescriptions, (3) € risk assessment models, and (4) marginal € analysis models. €

Pathologists, silviculturists, and other € forest managers need to work very closely € together to minimize damage from root rots in € general and annosus root disease in particular. € This is not news, but bears repeating and € re-emphasizing. The forest manager needs to be € frank and specific about what is wanted from a € pathologist, who can help name the problem, € measure its magnitude and offer possible € solutions. It is frustrating to both the € pathologist and the forest manager to consider a € cry for nebulous assistance. Four major € categories of guidance that can be provided by € the pathologist follow: €

1. Training for the manager and his or her € troops. €
2. Site-specific input to silvicultural € prescriptions, including detection and € curative or ameliorating alternatives. €
3. Risk assessment. €
4. Marginal analysis. €

Many of the presentations at this conference € discuss measuring the impacts of the pathogen, € rating the pathogen as a hazard, and suggesting € possible solutions. Thus, we are already on the € proposed trail. €

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TRAINING €

Training is done with enthusiasm and € professionalism by pathologists in Region 6 of € the Forest Service. For instance, a team € annually visits the Fremont National Forest and € presents a demonstration-and-solution session € covering all forest diseases and insects of € interest specific to that part of the Region. € This training session is semi-formal and all € personnel, no matter what their discipline, are € invited. The audience is usually made up of € silviculturists, although other professionals € can benefit. €

The Forest Pest Management division of € Region 6 has also established an advanced € session, specifically for those writing and € signing silvicultural prescriptions. These € sessions have been very well received and some € nonprescribers have attended and benefited € immensely. In addition, the pest managers have € often provided training on the Fremont National € Forest for problems such as the mountain pine € beetle, enemies of white fir, and annosus on € ponderosa pine in seed orchards. This latter € instruction has usually been informal, with much € give and take between instructor and student. €

District and forest land managers should € constantly analyze training needs to determine € the following: €

1. Are there new problems with which they € must deal? €
2. Do new people need training? €
3. Is more intensive and specific training € on a particular disease needed? €
4. How long has it been since information € has been presented on the district for € everyone and is a refresher course € needed? €

Field people are in the best position to € identify training needs. Instruction can be € provided most successfully by pathologists when € field people have carefully considered their € needs and then given the pathologist sufficient € time to prepare for training. €

SITE-SPECIFIC INPUT €

The second category of guidance is € site-specific input to a given prescription. € For instance, in forests of the high desert of €

Oregon, three very general forest types can be loosely described: ponderosa pine, white fir, and lodgepole pine. As one walks through the white fir forests, many large stumps are found because for decades high-value old trees have been picked and plucked, and white fir snags and culls have been felled. Circles of standing dead trees around some stumps are found especially in the desert fringe area. This white fir forest has been called, by one expert, the finest annosus zoo in the world.

Annosus was a known problem of white fir but not considered a problem in ponderosa pine until recently. Before, prescriptions were easy: clearcut fir and plant pine. But although plantations of young ponderosa pine were well stocked and grew at good rates, brown seedlings begun to surround stumps from the previous stand. As a result, a joint study by an ecologist, a pathologist, and a silviculturist discovered certain dry ponderosa pine sites had significant infections of annosus root rot in ponderosa pine (Hopkins and others 1988).

A biological evaluation by Schmitt and others (1984) found only stumps 18 inches and greater in diameter generally serve as disease centers in the Pacific Northwest. Nonetheless, exceptions have been observed. For instance, a seed orchard with stumps less than 18 inches is now showing mortality from annosus root rot. The seed orchard was treated with borax, and a year later the stumps were cut lower. This second cutting was for accommodating machinery in the seed orchard. The stumps were not, however, dried sufficiently and were receptive to the annosus spores.

On a wet and productive site, where annosus is not a problem with ponderosa pine, the disease does occur on sugar and white pine. Questions remain about whether annosus will cross over to ponderosa pine on this site and, if it does cross over, will it kill or just cause some butt rot?

These cases have changed opinion on how to solve problems of annosus root rot on specific sites. The special problem analysis used and input to silvicultural prescriptions have been very valuable to silviculturists involved. Although silviculturists can usually make daily decisions unassisted, the help of the pathologist is critical in special cases such as those presented here.

Forest pest managers in Region 6 are being moved to smaller zones to provide help to groups of National Forests. The pest managers will be available more for stand-specific analysis and input. We view this as a very positive step in forest management because we don't believe one can use cookbook treatments for insects and disease any more than one can for reforestation, cutting methods, timber stand improvement, or any other facet of silviculture.

RISK ASSESSMENT

Risk assessment is important because broadbrush treatment causes unnecessary treatment in some areas and lack of treatment in other areas where significant damage results. Just as cookbook solutions to diagnosed problems cannot always be used, stands cannot be treated for "just in case". The probability of a disease appearing when nothing is done and when preventive measures are taken needs to be examined. Currently risk assessment has been done on white pine blister rust, Indian paint fungus, and the mountain pine beetle in both lodgepole pine and ponderosa pine (Dolph 1983, Filip and others 1983, Harvey 1983).

A model for assessing the risk of annosus root rot would be very appropriate for the land manager. The model could use size of stumps, dryness or wetness of the site, species mix, past harvest practices, and other variables. This model could be used for site-specific prescriptions to determine when to treat and when not to treat for annosus root rot. The money spent on collecting more data to run the model would likely be offset by not treating for annosus where unnecessary.

MARGINAL ANALYSIS

Marginal analysis has been used in fire management in the the [sic] Fuels Analysis Process program. This program integrates per-acre values that will be lost if the stand burns, with the probability of any given acre burning. With this process, the cost of changing the fuel loading and structure to reduce the effects of fire can be compared with the value of the stand if it burns. The bottom line is--cost of protection is not usually worthwhile if it is greater than the value of the stand (timber and nontimber values are included).

Similar programs have been developed for pest management. Silviculturists examined the effect of controlling dwarf mistletoe in lodgepole pine on the measured productivity of a site. At the time, pest managers in Region 6 had developed a program for a hand-held calculator. Mean annual increment (MAI) was calculated with and without the presence of dwarf mistletoe. The 20-cubic-foot rule for MAI (a stand producing less than 20 cubic feet per year is not considered for timber management) was incorporated into the program. The rule has subsequently been changed, but the tool is still useful.

Another example of marginal analysis is a program being developed, by pest management in Region 6, that will integrate timber values, dwarf mistletoe infection levels, and site productivity for indicating whether the silvicultural prescriber should clearcut a ponderosa pine stand because of dwarf mistletoe

infection and regenerate or should sanitize the stand. This program simply equates the cost of regenerating now with the value of the growth loss in the future because of dwarf mistletoe.

One recommendation for controlling phellinus is growing red alder for one or two rotations and then returning the stand to Douglas-fir (Nesbitt 1976, Hadfield 1985). If the loss from phellinus per acre was unknown, however, one could not determine if it was economically better to live with the disease or to change to a lower value species. A marginal analysis has since been completed for determining this (Filip and Wiitala 1984).

We must constantly be aware of both the cost of doing business and the value incurred from doing that business. Marginal analysis helps the land manager make good investments.

SUMMARY

In closing, it is important for pathologists to give periodic updated, state-of-the-art instruction to silviculturists and other land managers. The pathologist's expertise is needed for site-specific prescriptions for some stands. We also need the pathologist's help in determining the likelihood of a disease occurring and spreading. For without this assistance, we can either be blindsided by not seeing the disease coming or treat everything and drive up costs unnecessarily. Lastly, pathologists are needed to help develop marginal analysis for determining if more is being gained than being spent on a treatment.

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