



# UI Extension Forestry Information Series II

Insects & Diseases No. 12

## Can Forest Insects Be Managed?

*Randy Brooks*

Those who own forest land or work in the woods realize that bugs kill a lot of trees. What most people don't realize is that insects kill more trees each year than fires and chainsaws combined. Industry and government have spent countless resources trying to devise ways to prevent insect attacks on trees, to no avail.

As forest landowner, at some point you will be confronted by an insect pest and, as a result, may find yourself in a quandary. The final decision as to whether or not the problem can be ignored or should be addressed by deliberate action on your part should be determined by your management objectives and economic factors related to these objectives.

Regardless of how you approach the problem, bear in mind that good forest stewardship should include an element of protection. In order to develop and maintain a healthy and productive forest, one must be aware of potential pest problems and be ready take steps to ameliorate them. It makes little difference whether your primary reason for owning forest land

is to maximize timber production, to produce wildlife habitat, to provide aesthetics or some combination of the above. In order to attain any of these goals, one must occasionally deal with the threat of insect damage.

### Economic Considerations

For many owners of forest land, knowing what to expect in terms of the potential immediate and long-term economic consequences of damage that may be caused by a particular pest will have a major influence on their decision. This knowledge is fundamental to determining if you have a problem to begin with.

Generally, the more intensively you manage your forested land the less damage you are likely to tolerate. For example, landowners are less likely to tolerate insect damage in a Christmas tree plantation that required several hundred dollars per acre to establish, than in a naturally established forest that is held solely for recreational purposes.

### What is a Pest?

Any animal, disease-causing organism, or weed that prevents you from optimizing your management objective(s) is a pest. By definition, what one forest owner views as a pest may seem unimportant and be tolerated by a neighbor.

Following the same line of thought, the term outbreak refers to a situation where a pest reaches a population level that causes unacceptable damage to



*Conifers killed by mountain pine beetle.*



*Mountain pine beetle  
Dendroctonus ponderosae*

the landowner. Otherwise, populations of the pest are said to be sparse (or below economic threshold). Subsequently, landowner views may differ in terms of what constitutes an outbreak. The reason for this disparity is that different landowners may have completely different values and management objectives.

### **Preventative Maintenance**

Deliberate forest management is often the most effective means by which landowners can develop and maintain forests that are less susceptible to pest outbreaks and/or less vulnerable to damage if an outbreak occurs. Under most conditions, forest pest problems can be minimized by encouraging the right tree species on a given site (soil, exposure, microclimate, etc.), removing damaged or low-vigor trees, and minimizing between-tree competition for water and nutrients by thinning the stand at appropriate intervals.

History has taught us that under most circumstances a biologically diverse forest community is often less susceptible to outbreaks or more resilient to disturbance than a relatively simple community. Unless your management objectives demand a single species condition (monoculture), try to aim for multiple species. In any monoculture situation, structural diversity can be enhanced by maintaining a mixture of age classes. Generally, different age classes of trees (e.g., seedling, sapling, pole, sawtimber) are subject to different types of problems. The key is to make it as difficult as possible for a pest to reproduce, disperse, and become established in a suitable host. Another thing is that some pest problems are created by human activities that inadvertently create conditions for an insect or disease (wrong species on wrong site, etc.).

### **Chemical Control - a Necessary Tool**

A large number of pest problems are due to natural conditions that are favorable to the pest and which landowners may have no control. Weather that favors pest survival (e.g., a mild winter that enhances survival of gypsy moth eggs), drought that renders trees more susceptible to invasion by certain bark beetles, or conditions that may be detrimental to populations of the pest's natural enemies are examples of events over which the landowner has little influence.

Landowners are often left with no choice but to intervene directly with a pesticide. Chemical use is not necessarily bad and can often be part of a good stewardship plan. To take no action and let the problem "run its course" may result in an unhealthy and unproductive forest. In many instances, pest problems that go unattended for apparently valid environmental concerns create situations that may detract from the environmental and economic quality of forested land for years to come.

### **Pesticides - a Balancing Act**

The vast majority of pesticides applied to forested land are for weed control during reforestation efforts. Few chemicals are labeled for forest insect control and very little insecticide is applied annually to very few acres of forest land.

Insect control efforts are typically aimed at defoliators with the intent of saving foliage. Defoliation (similar to the tussock moth outbreaks) reduces tree growth or weakens the tree to the point where it is unable to defend itself against potential mortality-causing agents such as root diseases and bark beetles. We often refer to these as secondary agents, because typically they thrive only on the heels of other agents that affect the tree when it is in a relatively vigorous condition. Secondary agents are so called because ordinarily they are unable to become established in healthy trees. They are secondary only in an ecological sense but are important because they are usually the ultimate cause of tree mortality. Severe defoliation may also kill a tree outright, as usually happens following a single defoliation of conifers.

Chemical control of bark beetles is possible, but more feasible on individual high value landscape trees. Currently, the only chemical labeled for bark beetle (mountain pine beetle) control in the Pacific Northwest is carbaryl. Since the beetle is found under the bark, the bark must be saturated prior to beetle flight.

Control on a larger acreages is difficult (accessibility is an issue) and not very economical. Landowners should consider chemical application when it is acceptable economically and ecologically, and when the consequences of not treating may prevent the landowner from reaching management objectives. If properly applied (to include an assessment of need, selecting the correct product, formulation,

dosage, method of application and timing) chemical insecticides are a prudent and appropriate stewardship tool.

### **Biological Options**

A significant amount of research has been conducted towards biological control of pests. Many biological controls exist for weed management. Currently, biological controls do not exist for bark beetles.

Two biological options that may be appropriate for defoliating insects, such as Douglas-fir tussock moth, are a bacterium known as Bt (*Bacillus thuringiensis*) and a molting inhibitor called Dimilin®. The former effects a wide range of caterpillars that inadvertently consume the spores. The latter has a wider spectrum of influence. It may kill any insect that is in the process of molting and has a major impact on populations of aquatic insects. There are additional stipulations associated with these biologicals, but when applied properly under appropriate conditions they may be more compatible ecologically than a

chemical. Most biologicals affect a narrow spectrum of organisms relative to most chemicals and this is their appeal.

### **Tough Decisions**

Sound forest management requires many decisions. The landowner must be the decision maker when it comes to their forest. Seek guidance from professionals and obtain the information required to make informed decisions about potential pests in your woods. Develop a forest management plan and include a list of preventative and direct control strategies available for dealing with pests you might encounter. A well written management plan and active forest management are vital ingredients for good stewardship.

To answer the question, can forest pests be managed - yes, they can. But active forest management is the key, and as we extension foresters like to say, thin, thin, thin!