

FOREST PROTECTION - AN INGREDIENT FOR GOOD STEWARDSHIP

By Douglas C. Allen

As an owner of forest land, 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 in the form of some deliberate action on your part is determined by your management objectives, economic factors related to these objectives, and a myriad of less tangible social and environmental attitudes.

Regardless of how you approach the problem, you should bear in mind that good forest stewardship, by definition, includes an element of protection.

In order to develop and maintain a healthy and productive forest, one must be cognizant of potential pest problems and often take steps to ameliorate them. I view "productivity" in the broadest sense, determined basically by your management objectives. It makes little difference whether your primary reason for owning forest land is to maximize timber production, to produce wildlife habitat, is solely to provide you and yours with amenable surroundings, or a combination of the above. In order to attain any of these measures of productivity, one occasionally must 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. Actually, this knowledge is fundamental to determining if, in fact, 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, usually we are less likely to abide insect damage in a Christmas tree plantation that required several hundred dollars per acre to establish and tend, and where the appearance of the final product directly determines its value, than in a naturally established forest that we hold solely for recreational purposes. Similarly, a northern hardwood stand that is managed passively for hunting, may not warrant the same protection investment it would if it were de-

veloped into a commercial sugarbush.

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, then, what one woodlot owner perceives 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 the abundance of an organism attains a level (density) that causes damage which is intolerable to the land owner; otherwise, populations of the pest are said to be "sparse." So, here again, landowner views may differ in terms of what constitutes an outbreak. The reason for this disparity is that the two owners may have totally different values and management objectives.

Preventative Maintenance

Deliberate forest management is often the most effective means by which we 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 severely damaged or low-vigor trees, and minimizing between-tree competition for water and nutrients by thinning the stand at appropriate intervals. Also, 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 (as in a sugarbush, for example), encourage multiple species. In a sugarbush (or any single species situation), one can enhance structural diversity 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 that we have learned from hindsight, is that many of our most serious pest problems are

created by human activities that inadvertently fashion ideal conditions for an insect or disease. This suggests that human intervention, in turn, should be an effective way to obviate or minimize many problems.

Chemical Control - a Necessary Tool

A large number of pest problems, however, materialize because of natural conditions that are favorable to the pest and over which landowners 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 innerbark pests such as pine 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. We are often left with no choice but to intervene directly with a chemical insecticide.

Chemical use is not necessarily bad and, in fact, often can be part of good stewardship. 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 ostensibly valid "environmental" concerns, create situations that detract from the environmental and economic quality of forested land for decades.

If you as a landowner are willing to accept the possibility of this outcome rather than apply a chemical, that is your right. However, before making this decision one should be aware of the potential consequences. Similarly, one should use a little common sense.

Pesticides - Good News Bad News, a Balancing Act

First, I think it is important to realize that region-wide annually we apply very little insecticide to very few acres of forest land. In the northeast, these control efforts generally are aimed at defoliators with the intent of saving foliage. Loss of foliage 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, or innerbark feeding insects that girdle the plant. We often refer to these as "secondary" agents, because

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2 typically they flourish 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, indeed, they are important because frequently they are the ultimate cause of tree mortality.

Severe defoliation also may kill a tree outright, as usually happens following a single defoliation of conifers, or when broadleaved trees are affected for several years in a row.

Now for the common sense part! Every action that we take to manage a forest can have adverse ecological consequences, some of which are more long-lasting than others. Even many of the so called "biological control" methods, can adversely affect life systems other than that of the target pest. I am convinced that there are many situations where complete defoliation of a forest community will be no less disruptive than a properly applied insecticide. Will defoliation affect organisms other than the tree? Yes indeed! Think of the birds that require foliated crowns in which to build nests. What about ground-nesting birds that depend on the shade from defoliated overstory trees? Many trees and plants can be stressed by increased soil temperatures that often occur when the shade provided by foliage is removed. Shading that trees provide is often a critical part of the environment of vertebrates and invertebrates that inhabit small streams. And so

forth.

It is not my intent to encourage chemical use. I try to convince a landowner to apply a "hard" chemical only when I know that it is acceptable both from an economic and ecological standpoint, and the consequences of not treating will in all likelihood prevent that person from attaining management objectives. If properly applied; to include an assessment of need, selecting the correct material, formulation, dosage, method of application, and timing, chemical insecticides are a prudent and appropriate stewardship tool.

Biological Options - There Are Some

During the past twenty years or so, a significant amount of research and development supported by innumerable federal agencies, industry and certain state organizations has resulted in a variety of more ecologically sound direct control methods. In a broad sense, this arena is referred to as "biological insect pest suppression," and includes techniques that range from classical biological control (manipulation of parasitoids and predators) to genetic engineering methods. For example, if we go back to the defoliator situation that was posed above, in the northeast we have two "biological" options that may be appropriate for many situations; a bacterium known as B.t. (a much easier handle than the tongue-twisting name for this bacterium, *Bacillus thuringiensis*!) and a molting inhibitor called Dimilin. The former affects a wide range of nontarget lepidopteran cat-

terpillars 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 it is thought to have a major effect on populations of aquatic insects. There are additional caveats associated with these biologicals, but if applied properly under appropriate conditions, they may be more compatible ecologically than a hard chemical. On balance, both biologicals effect a narrow spectrum of organisms relative to most chemical insecticides - and this, of course, is their appeal.

Tough Decisions

Sound forest management requires many decisions and you, the landowner, must be the decision maker. Seek guidance from professionals and obtain the information required to make informed decisions about potential pests in your region and acquaint yourself with the menu of preventative and direct control strategies available for dealing with them. Do not neglect this responsibility to protect the economic integrity and ecological welfare of your woodlands. This responsibility is an indispensable ingredient of good stewardship. ▲

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