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Eye on the Environment

Forest Insects and Diseases: Not Just Pests and Tree Killers

By Mike Palladini

What's killing those trees? Anyone who's spent much time in the forests of the Clearwater and Swan Valleys has likely had ample cause to ask that question. Whether in our backyards, in working timberlands or in the wilderness, most of us have encountered trees that were declining or dead for reasons that were not outwardly apparent.

So what is killing those trees? Chances are it is one or more of the many insects and diseases that inhabit our forests. A broad array of bark beetles, wood borers, defoliators, root diseases, foliage diseases, parasitic plants and stem decays occur in the Seeley Swan.

As their names suggest, these organisms can affect just about every part of a tree and, between them, they can infect or infest every tree species in the forest. They utilize the tree's sugars and water to survive and reproduce and, in doing so, may injure or kill their host.

Under the right circumstances, some of these organisms have the potential to kill large numbers of trees and cause substantial economic loss in working timberlands. They may also affect high value trees, like those that provide privacy in a campsite or shield us from the summer sun while in our yards.

So, you might ask, where did these destructive organisms come from? The answer is they've always been here.

With a few notable exceptions, the insects and pathogens that cause decreased vigor and mortality in trees throughout the Seeley Swan are native, have co-evolved with their tree hosts over millions of years, and still play the important roles in the forest ecosystem they always have.

These organisms assist in nutrient cycling, act as pollinators, and provide an important food source for many species of wildlife. Further, researchers have found that, with the exclusion of fire, insects and disease have become the major disturbance mechanism driving forest succession in many areas.

It is also important to note that, though there are many species of insects and pathogens that utilize the forest in our area, most are harmless or even beneficial. Those that are responsible for the majority of tree mortality or damage and resultant economic loss only reach outbreak or epidemic levels periodically and under specific sets of circumstances.

We've all seen the headlines, "Beetle infestation at epidemic levels on forest land," "Beetle epidemic spreading rapidly," "Beetle epidemic destroying forests." Beetles, bark beetles to be more specific, are just about everywhere in our forests. In fact, there are over 600 species in the western United States.

Bark beetles have evolved some interesting adaptations for their lives within trees. Adults bore directly through the outer bark until they reach the juicy layer of tissue that transports the sugars the tree needs to survive. Here, they construct a tunnel in

which they feed on those sugars and lay their eggs. After the eggs hatch, the larvae feed outward from this tunnel. These egg and larval galleries, as they are known, will eventually girdle the host tree, preventing the flow of nutrients and effectively killing it. After completing their earlier life stages in the inner bark, these beetles emerge as adults that will search out new trees in which to begin the process again.

Despite their staggering diversity in western forests and parasitic nature, only a handful of bark beetle species are actually tree killers. Further, those that do periodically reach epidemic levels and cause widespread damage are generally attracted to trees that are stressed or less vigorous, whether because of old age, drought, competition for resources or previous infection or infestation.

It is also important to make the distinction between bark beetles, which tend to be small and easily overlooked, and another much more obvious group of forest beetle, the wood borers.

Wood borers are those large bodied, tank-like beetles that tend to be hard to miss and that many of us have found clinging to our shirts, our car interiors or our living room furniture. Though these stout insects also feed on tree tissues and appear as if they could do some serious damage, they are rarely tree killers and tend to come in after the tree is effectively dead from other causes. Further, they are important decomposers that assist in recycling a tree's nutrients back into the soil.

Forest diseases tend to receive far less press than bark beetles but, depending on the type, can be far more destructive. Root diseases, which are often difficult to find evidence of without careful investigation, are the most

damaging group of tree diseases. They are a diverse group that affects most tree species found in the Seeley Swan.

These fungal pathogens readily travel underground from the roots of infected trees to those of healthy trees and, in some cases, through the soil itself. In many cases, infestation by one root pathogen may allow for that by another, and most can persist for decades in the roots and stumps of dead trees.

Root disease spread often results in enlarging "pockets" or "centers" of dead and dying trees. These pathogens can also facilitate infestation by bark beetles, which can detect infected trees long before they show outward signs of decline. Though some have the ability to kill large numbers of trees and cause substantial economic loss, root diseases also act as important agents of localized disturbance driving beneficial changes in stand structure and composition.

Insects and disease are ubiquitous in the forests of the Clearwater and Swan Valleys. Though managing for them is important in minimizing loss of valuable timber, we should remember that these organisms are an important component of the forest ecosystem, one that can be beneficial as well as destructive. Their ecological roles are complex and, though some may periodically cause economic loss under the right conditions, all contribute to the processes that allow for the continued existence of our beautiful and productive forests.