

Flathead Valley Forest Insect Threats - Bullet Brief 2012:

- Mountain pine beetle.
 - Host trees: Lodgepole and ponderosa pine.
 - Prefers overstocked stands of stressed trees. Stands over 80 years old are most susceptible.
 - Damage: A bark beetle, the larvae create tunnels in the cambium layer between bark and wood. The tunnels prevent the flow of water and nutrients between the root system and the crown of the tree. Needles turn brown and tree dies.
 - Status: After several years of infestation in western Montana, this pest *may be* leveling off or in decline.
 - Treatment options:
 - Verbenone packets applied to trees on or after July 1 and prior to July 15.
 - The proper application of insecticides to individual trees can protect them from attack by mountain pine beetle. Spraying trees to prevent attack is an effective way to protect a small number of high-value trees. Currently, there are three chemicals registered by U.S. EPA that are effective in preventing bark beetle attacks. These are carbaryl, permethrin, and bifenthrin.
<http://beetles.mt.gov/Preventing/Carbaryl.asp>
http://csfs.colostate.edu/pages/documents/Thoughts_on_spraying_trees-version2_final_April_2009.pdf
 - Thinning shows an "immediate" benefit by creating conditions in stands (more light, heat, and wind movement) that beetles don't like very much. A year or so after thinning, an increase in tree vigor will **generally make trees less susceptible** to beetles. Thinning in the face of an on-going outbreak has also resulted in benefits to leave trees because beetles **tend to avoid** stands that are less densely stocked, a benefit that is virtually immediate.
 - Once a tree has been hit by beetles, it cannot be saved.
 - <http://beetles.mt.gov/>
- Western spruce budworm.
 - Host trees: Douglas-fir, grand fir, subalpine fir, and Engelmann spruce.
 - Prefers overstocked stands composed of multiple size-classes of trees (sapling, poletimber, sawtimber).
 - Damage: A defoliator, larvae eat the new needles as they emerge from the bud.
 - Status: Unlike many defoliating insects, the budworm does not have a defined infestation cycle. It has been present in the Flathead Valley for three years. Impossible to predict how much long it will stay. This is a landscape level defoliator capable of affecting thousands of acres.
 - Treatment options:
 - Apply the correct formulation of *Bacillus thuringiensis* when majority of larvae are in the 1st and 2nd instars.
 - <http://dnrc.mt.gov/forestry/Assistance/Pests/WesternSpruceBudworm.asp>

- Douglas-fir tussock moth.
 - Host trees: Douglas-fir, grand fir, subalpine fir, and Engelmann spruce.
 - Greatest damage usually occurs on ridgetops and older, dense stands of a high percentage of susceptible hosts, or many trees with large crowns.
 - Damage: A defoliator, larvae eat new and old needles.
 - Status: Very predictable outbreak cycle. Infestations last a total of four years of which in only two years does significant defoliation occur. It is a pocket defoliator as opposed to a landscape level defoliator, and therefore it will not have the widespread impact of budworm.
 - Treatment options:
 - Apply the correct formulation of *Bacillus thuringiensis* when majority of larvae are in the 1st and 2nd instars.
 - <http://dnrc.mt.gov/forestry/Assistance/Pests/tussockmoth.asp>

- Pine butterfly.
 - Host trees: Ponderosa pine.
 - Prefers overstocked stands containing a high percentage of ponderosa pine.
 - Damage: A defoliator, larvae eat old needles.
 - Status: Currently, this is an issue in southwest Montana. However, increased numbers are evident here. Typically, outbreaks are short in duration. The population increases in size rapidly for a couple of years, and then natural enemies, environmental conditions and starvation usually lead to a dramatic crash in the population.
 - Treatment options:
 - Apply the correct formulation of *Bacillus thuringiensis* when majority of larvae are in the 1st and 2nd instars.
 - http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5324072.pdf

- Douglas-fir beetle
 - Host trees: Douglas-fir, occasionally western larch.
 - Prefers stressed trees greater than 14" in diameter at breast height.
 - Damage: A bark beetle, the larvae create tunnels in the cambium layer between bark and wood. The tunnels cut off the flow of water and nutrients between the root system and the crown of the tree. Needles turn brown and tree dies.
 - Status: Always present, the past three summers have had weather conditions favorable to trees. Therefore, there has been minimal activity. However, because defoliating insects are a stress factor on trees, expect beetle activity to increase as the budworm and tussock moth remain at infestation levels.
 - Treatment options:
 - MCH packets applied to trees prior to April 15.
 - <http://dnrc.mt.gov/Forestry/Assistance/Pests/dfbeetle.asp>

Host trees that survive defoliator outbreaks in a weakened condition may be more susceptible to bark beetle attack.

Silvicultural actions to reduce defoliator damage are best applied during the years between outbreaks, and are not recommended during or immediately following an outbreak.

Tree health and vigor, prior to defoliation, is a good indicator of how well it will recover from defoliation, and may be increased by management focused on maintaining vigorous growth favoring species diversity.

Bark beetle infestations, in trees weakened by defoliation, are common near the end of spruce budworm/tussock moth/pine butterfly outbreaks.