

tree defoliation in forests & woodlots

Without this cover, storms cause increased runoff. The quality of woodland streams and rivers suffer from both runoff and increased temperatures. For people, visiting the forest during an insect outbreak and while trees are defoliated is an unpleasant experience.

Surprisingly, there can be some benefits from heavy defoliation. If defoliation only occurs for one year, the trees that are killed are those that were weak to begin with. This natural thinning will benefit the surviving trees by freeing up resources that had been taken up by the weak trees. Increased light into the lower levels of the forest can benefit plants there. Flowering and fruit production by wildflowers and shrubs can increase as a result. Insect droppings are high in nutrients and can spur the growth of plants following outbreaks.

Will defoliation permanently change the forest?

If a forest experiences several cycles of defoliation by a specific pest, trees less favored by that pest will become more common. For example, in areas where gypsy moth has caused heavy defoliation of oaks every decade for many years, there is a small reduction (typically 3–6%) in the abundance of oaks and an increase in less-favored trees such as maple.

More information

For more information about defoliation, contact your DNR forest health professionals or call 1-800-642-MOTH.

Also visit the following web sites:

Forestry information from the Wisconsin Department of Natural Resources
www.dnr.state.wi.us/org/land/forestry/fh/

Gypsy moth information from the University of Wisconsin-Extension and Wisconsin Department of Natural Resources: www1.uwex.edu/ces/gypsymoth

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Produced by Cooperative Extension Publishing with funding from Department of Natural Resources.
Linda Deith, editor; Jody Myer-Lynch, designer.

Photo credits:

Billings, Ronald F. Texas Forest Service. Image 3226061 (forest tent caterpillar). www.forestryimages.org.

Diss, Andrea. Wisconsin Department of Natural Resources. Defoliated birch (cover photo).

McGovern, Terry. USDA APHIS PPQ. Image 2652044 (gypsy moth larva). www.forestryimages.org.

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John Kyhl and Andrea Diss



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Variation in defoliation by gypsy moth. Oak defoliated, white ash untouched.

All trees lose a few leaves prematurely every year. A low level of defoliation (5–10% of the leaves) is normal and is no cause for concern. However, heavy defoliation can threaten a tree's health. And when many trees in a forest are defoliated, other parts of the forest community will also be affected.

Causes of defoliation

In Wisconsin, there are several common causes of heavy defoliation. Late frosts and other weather conditions can kill or cause tattering of young leaves. Fungal diseases can cause leaves to be deformed or drop off. Wide-scale defoliation of acres of trees is usually the result of feeding by population explosions of certain insects. Insects prefer some tree species to others. While defoliation



Forest tent caterpillar
Ronald F. Billings,
Texas Forest Service



Gypsy moth
Terry McGovern, USDA APHIS

may occur over many acres, some trees will suffer more than others. The native forest tent caterpillar goes through cycles of abundance with outbreaks about every 10 years in the northern third of Wisconsin. A recent invader, the gypsy moth, also has a 10-year cycle, but outbreaks may occur throughout the state.

Impact of defoliation on a tree

When a tree loses most of its leaves, it loses the ability to make food. Most trees have enough reserves to form a replacement set of leaves, but this badly drains the tree. Weakened trees may not be able to survive any further stresses such as drought or attack by other insects or diseases. They will also stop production of nuts or fruits and may even lose branches.

A tree that can't produce a new set of leaves after being heavily defoliated in the spring will not survive. If

a tree is heavily defoliated repeatedly, the additive stress can cause dieback or death.

Defoliation generally has a greater effect on evergreens. Evergreens replace only a portion of their needles each year and thus are unable to replace all their foliage when stripped. Most evergreens are killed after a single complete defoliation, though some, like white pine, are capable of recovery.



Gypsy moth feeding on white pine
Andrea Diss, WI DNR

Impact of widespread defoliation on the forest

If many or most of the trees in a forest are defoliated, reverberations will be felt throughout the forest community. This sort of universal defoliation is rare when a forest contains many tree species, but can happen where there is little diversity. When the leaf canopy is removed, the summer sun beats down on the normally shaded floor. The increased heat dries out the soil faster than normal, causing drought stress. This can be the last straw for trees that suffered heavy defoliation already. Small animals and birds that depended on the cover of leaves to protect them and their nests may suffer increased predation. The canopy also buffers the violence of summer storms.



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