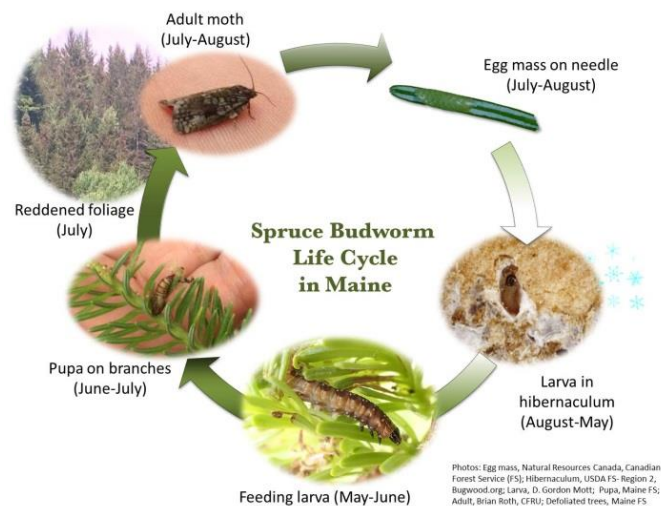


What is spruce budworm?

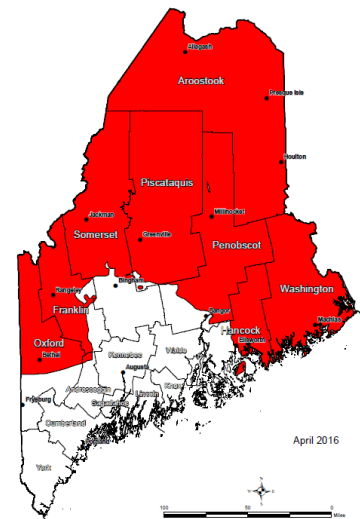
The eastern spruce budworm (*Choristoneura fumiferana*) is a native insect that causes major damage to Maine's spruce-fir forests on a regular cycle. Spruce budworm caterpillars feed on the buds and needles of fir and spruces. Under normal (endemic) conditions populations of this insect are so low that spruce budworm is hard to find. Periodically the budworm undergoes a population outbreak (epidemic) and becomes so abundant that serious feeding damage occurs. During epidemics defoliation is heavy enough that affected trees produce very little wood and many thousands of trees die.

- A native moth
 - Undergoes complete metamorphosis
 - Adult = moth
 - Immature = caterpillar (causes damage)
- Caterpillar eats needles of fir and spruce trees (hosts), eating some within the bud before the needles expand (budworm)
- Spruce budworm is always present in Maine's spruce-fir forests
 - Usually hard to find
 - Every 30-60 years populations outbreak, building to epidemic-levels in sync with maturing hosts
 - Epidemic-level populations persist for many years



What Happens During a Spruce Budworm Epidemic?

- Caterpillars and moths become abundant.
- Caterpillars eat conifer needles.
 - Favorite foods: **balsam fir, white spruce, red spruce, black spruce**, other conifers
- Feeding by the caterpillars leads to tree damage and death.
 - Damage includes
 - Defoliation
 - Top kill (after several years of heavy feeding)
 - Tree mortality (after about 5 years of heavy feeding)
 - Weakened trees not killed by budworm are more vulnerable to other insects (bark beetles and wood borers) and diseases (root rots). This can cause additional loss of wood and tree mortality.
- Direct impacts to trees and forests are most severe in northern and Downeast Maine.
 - Makeup of the forest is changed (types and ages of trees in the forest)
 - Wildlife is affected (some benefit, some lose)
 - Forest economy impacted (loss of mature timber; less wood produced; more wood available for the market (lower prices); job loss)



Area in Maine With at least One Year of Heavy Feeding by Spruce Budworm during the Previous Epidemic

What can I expect outside the area where budworm feeding kills and

damages trees? (Needs Development/Brainstorming from others)

- Recreational impacts
- Tourism impacts
- Job impacts
- Market impacts
- Moth flights

History

In Maine, five major spruce budworm epidemics have been identified through [tree-ring analysis](#), with rings dating back to the early 1700's. This suggests a cycle of 30 to 60 years in Maine forests where balsam fir occurs in more mixed stands than in Canadian forests. Additional, less severe outbreaks were not identified in the analysis. In the last century, spruce budworm outbreaks in Maine occurred during the 1910s, 1940s, and 1970s, with the 1910s and 1970s outbreaks being quite severe. The last epidemic is vivid in the memories of many who lived in Maine at the time. <http://maineforest.org/issues-information/maine-forests/budworm-journal/>

Glossary Possible words for a glossary

Entry	Definition
Complete Metamorphosis	Development through four distinct life stages: from an egg to larva to pupa to adult. During pupation larval tissues break down and reform into the adult insect. The larva and adult are often very different.
Conifer	A cone-bearing tree, often with leaves that are evergreen.
Defoliation	Premature loss of leaves or needles.
Epidemic	An unusually high density population of an injurious organism (such as an insect) which is likely to cause host injury (in contrast, low density populations are termed endemic).
Host	An organism on or within which another organism develops and obtains all or part of its food (SAF Dictionary of Forestry)
Organism	An individual living thing (insect, tree, bacterium, you).
Outbreak	A rapid buildup in the abundance of an organism that occurs in a given area. Sometimes used interchangeably with epidemic.