



Spruce Budworm Management for Homeowners

FORESTRY

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Spruce budworm caterpillars defoliate balsam fir and spruce (Figure 1). Healthy trees can tolerate a couple of years of heavy defoliation, but after three or more consecutive years of feeding, fir and spruce in yards will start to die (Figure 2).



Figure 1. Spruce budworm feeds on new needles. Not all needles are eaten, and some are tied together or to the branch with webbing.

Increase Resiliency to Spruce Budworm

- Thin out crowded fir and spruce; remove small or sickly trees to give the healthiest trees more sun exposure.
- Mulch yard trees properly. Add a 2- to 4-inch layer of mulch around the trees, but do not pile mulch against the trunk.
- Water yard trees during droughts. If one inch of precipitation is not received per week, water trees slowly to moisten the soil 6 to 9 inches deep.
- Avoid compacting soil, removing soil, or adding soil near trees.
- Avoid using lawn herbicides near trees.
- Trees usually do not need to be fertilized. Only fertilize trees if a soil lab test result suggests a need for fertilizing.

Before treating, it is critical that you correctly identify budworms (Figure 3). There are other insects that can defoliate fir and spruce, and the recommendations in this handout may not work against those. This handout is strictly aimed at ornamental trees in yards, not forests.



Figure 2. A balsam fir with a scorched top from spruce budworm feeding.



Figure 3. A spruce budworm caterpillar.

Insecticide Options

Certain insecticides timed correctly can sustain healthy trees through a spruce budworm outbreak. The most effective time for an insecticide treatment is when budworm caterpillars begin feeding just as buds begin to open and new growth expands, before much damage has occurred. By early summer, caterpillars have finished feeding and insecticide treatments will no longer serve any purpose. Since healthy trees can tolerate several years of defoliation without dying, consider spraying only after one or two years of noticeable defoliation.

- Spraying will only protect trees for the current year. During an outbreak you may wish to spray several years in a row to help trees survive, although spraying every year is not necessary. Once an outbreak subsides, stop applying insecticides. Your goal should be to use the least amount of insecticide possible.
- For spruce budworm control, use *Bacillus thuringiensis kurstaki* (Btk). Btk kills caterpillars that eat it; it will not kill other insects such as beetles or sawfly larvae. Organic farmers can use Btk.
 - An accurate application of Btk will reduce spruce budworm caterpillar populations sufficiently to retain most, but not necessarily all, new needles.
 - Spraying Btk should be timed when shoots have elongated $\frac{1}{2}$ - $\frac{3}{4}$ inch. Budworms focus their feeding towards the top of trees, so it is crucial to spray the entire tree canopy to protect it.
- There are other insecticides that can be used to kill spruce budworms, although they may be more harmful to beneficial insects. For other spruce budworm control options, consult [IPM for Midwest Landscapes](http://cues.cfans.umn.edu/old/Web/202SpruceBudworm.pdf) (<http://cues.cfans.umn.edu/old/Web/202SpruceBudworm.pdf>).
- For a list of licensed and certified pesticide applicators, please consult the [Minnesota Department of Agriculture](http://www2.mda.state.mn.us/webapp/lis/pestappdefault.jsp) (<http://www2.mda.state.mn.us/webapp/lis/pestappdefault.jsp>). Companies that offer aerial spraying services over forests have both general aerial and forest spraying licenses.

For more information on spruce budworm, see [Spruce Budworm in the Eastern United States](https://www.fs.fed.us/foresthealth/docs/fidls/FIDL-160-SpruceBudworm.pdf) (<https://www.fs.fed.us/foresthealth/docs/fidls/FIDL-160-SpruceBudworm.pdf>) published by the U.S. Forest Service. Note that listed pesticides may no longer be legal to use. Read and adhere to all pesticide labels.

For information on spruce problems, see the guide [Spruce problem diagnosis for yard trees](files.dnr.state.mn.us/assistance/backyard/treecare/forest_health/whitesprucedagnosis.pdf) (files.dnr.state.mn.us/assistance/backyard/treecare/forest_health/whitesprucedagnosis.pdf).

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