



## Managing Tent Caterpillars without Chemicals

by David Johnson



*Western tent caterpillars spin their silky, white tents on the tips of branches early in the spring just as new leaves are budding out.*



*Fully grown caterpillars leave the tent and can be found crawling on sidewalks or buildings.*

**T**he tent caterpillar is one of the most conspicuous and familiar insect pests in the Northwest. Their silky, white tents can easily be seen covering the tips of tree branches. The emergence of tent caterpillars in the spring is fascinating to children, but to most adults they represent a serious nuisance. Tent caterpillars eat the foliage of many deciduous trees and shrubs, especially alder, willow, fruit trees, and roses. During a heavy infestation they will migrate and feed on many other plants. For most people the sight of the tents is enough to spur them to action.

Tent caterpillars damage plants by eating the foliage as it emerges. A healthy plant will usually grow out new leaves by summer, but its growth may be reduced, making it more susceptible to the stresses of drought, cold, disease, and other insects. For this reason it is a good idea to monitor tent caterpillars closely and control them if necessary. Fortunately there are effective non-chemical control methods available. Before discussing these in detail, however, let's look at the life cycle of the tent caterpillar.

### **Biology of Tent Caterpillars**

The two kinds of tent caterpillars that occur in the Northwest are the forest tent caterpillar (*Malacosoma disstria*) and the western tent caterpillar (*Malacosoma californica*). Both are about two inches long when mature, but their body coloration and style of tent construction are different.

The Forest Tent Caterpillar is blue with black spatters and white, footprint-shaped markings. It does not actually form a true tent but instead spins a silken mat on tree branches or trunks.

In Western Washington the western tent caterpillar is more frequently seen. It has orange and black markings that run the length of its body. The eggs hatch out in early spring (April or May) when new buds are emerging. The tiny caterpillars immediately begin feeding, and the familiar tents begin to develop on the tips of branches. Usually one tent per egg mass is produced, a sort of community project of the colony. The caterpillars leave their tent to feed but return to it at night, guided back by strands of silk which they spin out as they move about. When the weather is cool or wet they tend to be less active and stay closer to the tent. The tent functions to exclude natural enemies, provide shelter from extremes in temperature or humidity, facilitate molting, and aid in colony communication.

The caterpillars molt (shed their skins) four times during their five to six week growing period, increasing in size with each molt. The outgrown skins can be seen within the tent webbing. After their last molt, when they are about two inches long, the caterpillars lose their gregarious habit and wander extensively searching for food. Their food choices become rather indiscriminate, and they feed on many garden plants. At this stage we see them crossing sidewalks and crawling on buildings as if they are taking over. This stage is short-lived, and they soon select a site within their old tent, inside a log, under loose bark, between folded leaves, or under house siding and spin their cocoon.

After about two weeks the adult moths emerge in late afternoon or early evening. They mate the first day, begin laying eggs immediately, and die within a few days. Male and female moths do not have functional mouth parts and so do not eat. The females lay several hundred eggs in a froth-covered band around small twigs or branches of the host tree. In two to three weeks the embryos develop into fully formed larvae, but they remain inside the eggs in a kind of hibernation over the winter. It is not until the spring, when new leaves begin to appear on the branches, that they actually hatch.

Tent caterpillar populations vary greatly from year to year. Severe outbreaks are periodic but do not follow a fixed cyclic pattern. The outbreaks persist for 1 to 4 years before being brought under control by various factors, including disease, parasites, scarcity of food, weather, or a combination of these factors. In other words, the caterpillars thrive and increase in population from year to year until conditions become unfavorable, and then their population plummets. The population gradually rebuilds when conditions are favorable. We notice severe outbreaks when conditions support vigorous caterpillar growth for several years in a row. The wide fluctuations in caterpillar population show how delicately balanced the ecological forces are.

### Natural Enemies

Since they are native insects, the western and forest tent caterpillars have many natural enemies. One is the tachinid fly, a parasite which attacks the caterpillar by depositing white eggs on its body. The eggs are visible in rows upon the caterpillars back. When the egg hatches, a small maggot burrows into the caterpillar and begins feeding, eventually killing it. If you look closely at the caterpillars, you can see whether or not they are being attacked by these parasites. If they are, you know that the natural controls are at work. Tent caterpillars are also subject to a viral disease called wilt, as well as many other lesser parasites and diseases.

Such natural controls eventually reduce population levels but the process is gradual over a period of years. During this time the population levels remain high and some plants may suffer severe damage.

### Control Methods

Controls may be necessary to prevent the caterpillars from causing an unacceptable amount of damage. The following control measures are aimed at reducing the pest's population to levels that do not harm a plant's health or affect its aesthetic value.

Controls are implemented when it becomes apparent that the caterpillars are becoming a nuisance. This judgement is made on the basis of one's own tolerance level for their presence. Most people view the tents as unsightly and threatening, since they are teeming with hundreds of crawling larvae. Remember, though, that these are native insects which are controlled in the long term by natural factors. Decide what level of damage you can tolerate and how many tents you can live with. Make a careful visual inspection of the trees in your yard, and count the number of tents in each tree. It is not necessary to remove every tent, but a tree with many tents may need to have most of them removed, especially if the tree is particularly valued. The caterpillars from a single tent may result in 20% defoliation of a small tree. Even if completely defoliated, a tree rarely dies, but this level of damage is unacceptable in most home landscapes. In wild areas, severe damage may be tolerated because it is part of the natural ecological process.

As with any insect pest, physical controls should be used first because these are the least disruptive to the ecosystem. Biological controls are the second choice. Care must be exercised when using biological controls because there is the potential to kill non-target species. Chemical controls are always the last resort because of their toxicity and environmental hazards. Specific physical and biological controls are described below. In the case of tent caterpillars, these methods are so effective that it should not be necessary to resort to chemical controls at all.



*A mass of eggs encircles a twig. The eggs are covered by a frothy material called spumaline. If the eggs are removed at this stage, during the winter, the emergence of hungry caterpillars can be prevented.*

### ■ Physical Controls

Tents may be easily removed by pruning. It should be possible to prune out most of the tents if they are not too numerous or too high in the air. Do this in the early morning or evening when the weather is cool and the caterpillars are still in their tents. A pole pruner is useful to reach tents high in the air. If you have trees which are regularly infested, it would be worthwhile to buy a pole pruner so that you need not resort to spraying merely as a means of reaching tents. Dispose of the tents in a sealed paper bag in the garbage or compost pile. The traditional method of burning tents is not recommended because of the fire hazard. When the caterpillars disperse and enter buildings or cover sidewalks they can be vacuumed.

The egg masses can be rubbed off of branches while pruning during the winter. This is a preventative strategy which will reduce the numbers of hungry caterpillars that hatch in the spring. The egg masses appear as a gray or brown frothy material which has hardened to look somewhat like styrofoam. Most of the egg cases are one-half inch long bands found encompassing twigs. A plastic spoon is a handy tool to use in removing the eggs. Scrape carefully, being careful not to damage the bark on the twigs. Deposit the eggs and the spoon in a bag, seal it tightly, and place it in the trash.



*The primary biological control for tent caterpillars is the bacterium called B.t. The caterpillars must eat it for it to be effective. Exercise great care in using it because it is toxic to all types of caterpillars, including those which mature into beautiful butterflies.*

### ■ Biological Control

If pruning out tents does not reduce the population below an acceptable level, then the affected plants may be sprayed with the biological insecticide *Bacillus thuringiensis*, called B.t. It contains a naturally occurring bacterial toxin that acts as a stomach poison after it is eaten by the caterpillar. B.t. is relatively non-toxic to organisms other than caterpillars. The product (which is available under many trade names) should be applied to affected plants only when signs of active feeding are apparent. It is not effective at any other time. Thorough coverage of the foliage, **not the caterpillars**, is necessary to assure that the caterpillars ingest enough B.t. to be effective.

After eating the sprayed foliage, caterpillars sicken and stop feeding immediately, but it may take several days before they begin to die. If you are accustomed to seeing the rapid effect of a chemical pesticide, you may think the B.t. isn't working. Be patient. B.t. effectively reduces tent caterpillar populations and is much less toxic to humans and non-target species than broad-spectrum chemical controls. However, B.t. is still a pesticide that should be used only after physical controls fail or are determined to be inappropriate for the situation.

B.t. formulations do contain "inert" ingredients which may not be completely harmless, and labels may carry warnings about avoiding eye contact. As is the case with chemical insecticides, insects may develop resistance to bacteria, causing them to become less effective. **B.t. is toxic to all types of caterpillars, even those that are not considered pests. Its indiscriminate use can reduce the populations of non-target caterpillar species that are attractive butterflies in their adult stage.** Therefore if you use B.t., it is important to control the spray so that it is confined to the affected plant. This will minimize the impact on other types of caterpillars. Be sure to read the label, and follow all instructions exactly. Follow the additional precautions listed in the box on the next page.

### ■ Chemical Controls

Chemicals are sometimes used to control tent caterpillars. All of these, however, are highly toxic to the tent caterpillar's natural enemies. While their use drastically reduces caterpillar numbers quickly, the longer-term effects are less predictable. Non-selective pesticides can actually increase pest populations in future years if pests are not controlled by natural predators.

Carbaryl, the chemical insecticide most often used for tent caterpillars is highly toxic to bees. Residual material from these sprays is carried back to the hive and can kill all of its occupants. Carbaryl from landscape runoff can also endanger salmon and other fish species, as well as the insects they rely on for food.

For these reasons the use of chemical insecticides to control tent caterpillars is strongly discouraged. ■

*The illustrations on the first two pages are by Patricia Spencer. They are being used with the kind permission of the artist. Other illustrations are taken from "Art for Environment's Sake," a publication of the Environmental Task Force, Washington, D.C.*



*Chemical controls are highly toxic to beneficial organisms, such as birds, bees, ladybugs, and predatory insects. They should not be necessary to control tent caterpillars.*

## References

Collman, Sharon. *Biology and Control of Tent Caterpillars*. WSU Cooperative Extension Bulletin #1106.

Olkowski, William and Helga, and Daar, Sheila. Integrated Pest Management for Tent Caterpillars. *Common Sense Pest Control Quarterly*. Bio-Integral Resource Center.

## Disposal of Pesticides

Insecticides, including B.t. products, are pesticides and should not be disposed of down the drain or in the trash. For information on where and how to dispose of pesticides, contact your local household hazardous waste agency. In the Seattle/King County area, call the Hazards Line at 206-296-4692.

**The Washington Toxics Coalition is a non-profit organization dedicated to protecting public health and the environment by preventing pollution. Please write or phone for information: WTC, 4649 Sunnyside Ave N, Suite 540, Seattle, WA 98103. Phone: 206-632-1545. Visit our Internet Web site at [www.watoxics.org](http://www.watoxics.org).**

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## Use B.t. with Care

- ❖ Read the label and follow directions exactly.
- ❖ Target the pest. Apply only when caterpillars are feeding. Cover foliage thoroughly.
- ❖ Confine spray to affected plants. It is not necessary to treat nearby trees which are not infested.
- ❖ Do not spray when it is windy or raining.