Forest Tent Caterpillars in Minnesota

The forest tent caterpillar, *Malacosoma disstria*, occurs throughout most of the United States and Canada wherever hardwood trees are found. It periodically infests aspen and many other tree species over large areas of northern Minnesota. The caterpillars are commonly, but mistakenly, called 'armyworms'. Groups of these caterpillars can defoliate trees, potentially injuring them. They are often considered a nuisance when they are found around human dwellings or on roads.

Forest tent caterpillar (Steven Katovich, insectimages.org).

Forest tent caterpillars aggregated on a tree trunk (Whitney Cranshaw, insectimages.org).

Life Cycle and Description

Egg mass of forest tent caterpillar (Steven Katovich, insectimages.org).

Forest tent caterpillar larvae emerge from egg masses in early to mid-May, about the same time aspen leaves begin to open. Caterpillars feed actively on aspen and other broadleaf trees for five to six weeks. Despite its name, the forest tent caterpillar does not make a true silken tent. However, the larvae do spin an inconspicuous silken mat where caterpillars congregate on the trunk and branches.

In June, older larvae become restless and move around trees and other vegetation to find food. Significant damage to nearby plants can occur at this time. Near the end of June, full-grown caterpillars wander from where they have been feeding to search for protected places to spin silky cocoons (to pupate). Full-grown caterpillars are about two inches long, mostly blue and black, with a row of white, footprint shaped markings on their backs, and many hairs along the edge of the body.

Forest tent caterpillar adult moth (Mark Dreiling, insectimages.org).

Adult moths emerge from cocoons about two weeks later in mid-July. These tan moths are nocturnal and are attracted to lights at night. Adults live for about five days. During this time, they deposit 100 to 350 eggs in gray cylindrical masses surrounding small twigs. The eggs overwinter and larvae hatch from them during the next spring. There is only one generation per year.

In Minnesota, the number of forest tent caterpillars changes in relatively predictable cycles. At the beginning of this cycle, forest tent caterpillars can be difficult to find. Over a period of eight to thirteen years, their populations start to increase until they reach tremendously large numbers. These outbreaks usually last for about three to four years in Minnesota, although in southern areas of the United States outbreaks have been known to last as long as nine years.

Finally, natural controls, including cold or damp spring or early summer weather, starvation, and viral disease, can cause populations to crash to very low numbers. Populations are also significantly reduced by wasps and flies that parasitize eggs, larvae, and pupae. The most conspicuous of these parasitic insects is a large gray fly, *Sarcophaga aldrichi*, which is often a nuisance to humans. This fly is native to Minnesota. Their numbers increase in response to forest tent caterpillar outbreaks.

Food Plants

Forest tent caterpillars can defoliate a large number of broadleaf trees and plants. In Minnesota, quaking aspens, *Populus tremuloides*, are most frequently attacked. Other highly preferred tree species in Minnesota include balsam poplar, basswood, oaks, ashes, birches, alder, and fruit trees. When trees are defoliated, forest tent caterpillars may also damage other nearby plants. Damage has been found on vegetables, fruit trees and other small fruits, and nursery crops. This caterpillar rarely feeds on red maple and conifers, such as pine and spruce.

Damage

Trees that are fed upon by forest tent caterpillars are rarely killed by these insects because following complete defoliation, deciduous trees are able to produce another set of leaves during the same season. The main impact of forest tent caterpillar feeding on deciduous trees is a reduction in the rate of growth. Vigorously growing trees can tolerate up to two or even three consecutive years of heavy defoliation without suffering serious damage or mortality. If a prolonged defoliation cycle occurs, (four or more years), moderate to heavily defoliated trees may experience a reduction in growth, suffer branch dieback and could eventually be killed. A general rule of thumb is that complete defoliation can occur when an average of nineteen egg masses are found on an aspen tree that has a six-inch diameter trunk at about four and half feet. When trees become stressed, such as during a drought, they are less tolerant of defoliation. A stressed tree can be injured or even killed in a much shorter time period than an unstressed tree. Protecting high value trees would be appropriate during forest tent caterpillar outbreaks when trees are under moisture stress.

Nuisance Behavior

A house covered in forest tent caterpillar cocoons (Steven Katovich, insectimages.org).

When mature larvae wander to find a place to pupate, their search often takes them to nearby buildings and yards. They do not bite people or harm animals or property, but they can be very annoying when large numbers are found crawling or clustering on building walls, lawns, and sidewalks. They also become a nuisance when they build cocoons on the sides of buildings. These cocoons can be very difficult to remove. These activities are sometimes more upsetting to people than any feeding damage that they inflict on trees. When forest tent caterpillars cross roads and streets and are crushed, they can cause surfaces to be greasy and slippery.

The large gray parasitic fly, *Sarcophaga aldrichi*, often becomes very abundant during forest tent caterpillar outbreaks and is itself a nuisance. Known as the friendly fly, this native parasite lands on any object, including people. It is also sometimes referred to as the government fly because of the mistaken belief that a government agency has released it (however, this is a naturally occurring fly). This fly does not bite and is harmless, but it moves very deliberately and often is difficult to discourage. This insect is very important for ending a forest tent caterpillar outbreak naturally. The most practical solution is to tolerate this beneficial insect until its numbers also naturally decline.

Management--Home landscape

In the home landscape, simple physical procedures (mechanical control) by the homeowner can be carried out to help manage the forest tent caterpillar. One management procedure is to remove and destroy overwintering egg masses from branches of small trees before eggs start to hatch in the spring. Furthermore, caterpillars and cocoons can be brushed off houses, picnic tables, or decks with a stiff broom or brush or knocked down with a spray of water. Be careful not to crush too many caterpillars; they can smear and leave marks on some paints.

Another management tool available to the homeowner involves chemical treatment with insecticides. Insecticides should be sprayed when caterpillars are small and easy to manage. Larger larvae are more difficult to kill and can continue to heavily defoliate trees before some insecticides take effect. An effective larval insecticide is Bacillus thuringiensis var. kurstaki (also referred to as BT), a microbial insecticide derived from a bacterium. BT offers effective control and conserves beneficial insects. Other insecticides available to homeowners that conserve beneficial insects are insecticidal soap, spinosad (Conserve), and azadirachtin (Azatin). Additional insecticides available to homeowners include carbaryl (Sevin), malathion, acephate (Orthene), and permethrin. (See Table 1.)

In addition to physical controls, an insecticide may give some relief from migrating larvae. Spray a product labeled for use around the outside of buildings (such as permethrin) on the exterior of homes. Use all insecticides carefully and judiciously. Do not overspray or repeat treatments more often than is allowed by the label.

Additional advice for managing forest tent caterpillars around homes can be found in the Minnesota DNR Forest Tent Caterpillar Homeowner Tip Sheet.

Table 1. Insecticide recommendations for homeowners and tree care professionals

Apply insecticides when larvae are small (1 inch or less), usually in early to mid-May.

		Examples of Insecticide Trade Names	
Active Ingredients	**Class of Insecticide**	**General Use (available to public)**	**Commercial Use**
Insecticides conserving beneficial insects (parasitoids and predators)			
azadirachtin	botanical	Azatin, BioNEEM	◆
Bacillus thuringiensis var. kurstaki	microbial	Dipel, Thuricide	◆
insecticidal soap	biorational	M-pede	◆
spinosad	microbial	Conserve	◆
Conventional Insecticides			
acephate	organophosphate	Orthene	◆
bifenthrin	pyrethroid	◆	Talstar
carbaryl	carbamate	Carbaryl, Sevin	◆
cyfluthrin	pyrethroid	◆	Decathalon, Tempo
esfenvalerate	pyrethroid	Bug-B-Gon, Multi-Insect Liquid	◆
fluvalinate	pyrethroid	Mavrik Aqua Flow	◆
lambda-cyhalothrin	pyrethroid	◆	Scimitar, Battle
malathion	organophosphate	Cythion, Malathion	◆
permethrin	pyrethroid	Eight	◆
phosmet	organophosphate	◆	Imidan

Active ingredients are often listed in fine print so check the label carefully. Common examples of trade names are given strictly for convenience. Use of trade names does not imply endorsement.

Follow all label directions carefully. Be sure the insecticide is labeled for the plant that is intended to be treated. Insecticides should never be sprayed on surfaces which people routinely contact or on hard surfaces that can accelerate insecticide runoff into water.

The availability and recommended use of specific insecticides may change at any time. If suggestions in this publication differ from recommended uses on a label, the label is the final authority on how you may legally use that insecticide.

Management--Wood Lot

In wood lots, many animals, such as birds, rodents, and even bears, eat forest tent caterpillar larvae. People need to be more tolerant of these pests, unless defoliation is severe and prolonged enough to cause branch and tree mortality. In areas experiencing high levels of forest tent caterpillar defoliation for a number of years, aerial spraying of an insecticide may be considered as a management option.

In wood lots, resort areas, and campsites where a relatively large acreage may need treatment, application of the spray by aircraft is the most rapid, effective, and economical method. Spraying should not be conducted when breezes threaten to drift the insecticide over open water or other sensitive areas. When a recreational or residential area is sprayed, an additional strip about 400 feet wide adjacent to the area should also be treated. This barrier strip will serve to absorb migrating caterpillars.

As is the case in the home landscape, the insecticide BT is preferred since it does not harm people, birds, or beneficial insects and is generally considered first in aerial spray programs. Some insecticides are not registered for use by aerial spraying, so consult the insecticide label. Dimilin (diflubenzuron) should not be used near wetlands or water as the insecticide is a chitinase inhibitor and may affect aquatic insects and other arthropods.

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