
FOREST TENT CATERPILLAR IN THE UPPER PENINSULA

The forest tent caterpillar (FTC), *Malacosma disstria*, is a native defoliator of a variety of hardwood trees and shrubs. The FTC's range in North America extends from coast to coast and from the tree line in Canada to the southern states. It feeds primarily on aspen, oaks and will occasionally defoliate areas of sugar maple in the Upper Peninsula. The only hardwood avoided is red maple. FTC will eat tamarack foliage during outbreaks. It is often referred to locally as the armyworm.

Widespread outbreaks of FTC occur at intervals of 10 to 15 years. Statewide, areas with high numbers of caterpillars last for 3 to 5 years. Outbreaks in any one locality normally last for 2-3 years. FTC epidemics commonly begin over large areas simultaneously. This is primarily caused by weather conditions preceding an outbreak. Population buildups follow drought cycles, especially warm, dry springs. Outbreaks normally collapse quickly due to natural causes.

Defoliation begins in late-May in the U.P. with the greatest leaf loss occurring in the first three weeks of June. This year's early spring will see peak defoliation occurring somewhat earlier with a sudden disappearance of larvae by mid-June if the weather stays warm. Cool weather slows development and feeding, extending the duration of outbreaks.



Forest Tent Caterpillars.
(Note footprint shaped marks.)

DAMAGE

Defoliation from FTC generally does little damage to tree health. FTC defoliation reduces the vigor of trees, but vigor recovers within a few years of population collapse. Trees generally develop a second set of leaves after attack if more than 50% of the canopy is lost. This second set of leaves is smaller and tends to cluster near the branch tips. The year following an outbreak, tree leaves are often still smaller. By the second year after the collapse of an outbreak 80% of the trees have normal sized leaves.

FTC defoliation reduces stem growth. As defoliation intensity and duration increase, stem growth decreases. For example, a single light defoliation does not noticeably reduce growth. However, one heavy defoliation of aspen may reduce stem growth by 50-60%. Two years of heavy defoliation reduces growth by 90%. Growth rate recovers quickly, returning to 80% of normal during the first year after the end of the outbreak.

Trees rarely die from FTC defoliation alone. FTC defoliation weakens trees and makes them more susceptible to attack from a wide variety of other pests. Prolonged defoliation can kill trees if combined with other problems such as drought, late spring frost, or other defoliators. This is the first year of the current FTC epidemic in most areas, so significant impacts on tree growth or mortality are not expected.

FTC NUISANCE

During outbreaks, FTC numbers can range from 1 to 4 million per acre. They create an extreme nuisance to people living or vacationing in forested areas. Young larvae spin a thread and fall from the trees onto picnic tables, patios, and people causing serious annoyance. Mature larvae wander widely in search of food, often migrating in large numbers across roads and open areas. Resting larvae commonly form large clusters of thousands of caterpillars on buildings, trees, cars, campers, and other stationary objects. Caterpillars emit a greenish-black fluid when disturbed and insect frass (excrement) becomes a serious nuisance as it rains down from insects feeding in the tree crown.

Mass flights of tent caterpillar moths in late-June to early-July are common during outbreaks. These flights can move millions of moths many miles, creating a nuisance where the flight ends. Mass flights can trigger new outbreaks suddenly where the insect had not been a problem before. These flights are often associated with the passage of a cold front.

LIFE CYCLE

The FTC overwinters in an egg mass on twigs of host trees. The eggs are extremely hardy and easily survive winters. It has been shown that less than 10% of the eggs are killed at -40 F and 50% survive -50 F. Eggs hatch in the early spring about the time of bud break. The larvae have five growth stages each lasting 7 to 10 days. During the early stages, larvae remain in clusters on the leaves. They are blue-black with white spots down the back.



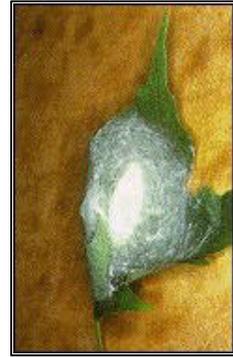
Egg masses on twigs.

Long brown hairs sparsely cover the body.

Older larvae develop deep blue velvet coloration with a sparse covering of long brown hairs. A line of white to cream colored spots runs down the back. These spots often look like footprints or a series of keyholes. As the larvae grow, they consume increasing amounts of leaves, and wander widely in search of food, dropping from the leaves to the ground. Large larvae are solitary, but commonly rest in large clusters.

Mature larvae spin silk cocoons with white to yellow threads on vegetation, buildings, and other stationary objects to begin pupation. This begins in mid to late June. Adults emerge 7 to 10 days later. The adult moth has an 1 to 1 1/2 inch wing span, is buff colored and has a broad brown band across the front wings. They are night fliers and come to lights in large numbers. As a result of this, it is common to find high populations of adult and larvae near populated areas.

After mating, the female lays 30 to 50 eggs in clusters about 1/2 inch long around a twig. Each female lays 100 to 350 eggs. A tough casing covers the egg mass and protects the eggs from drying.



FTC Cocoon in leaf.



FTC Adult (moth)

NATURAL CONTROL

The FTC is a native insect that has evolved in the forest ecosystems of North America. Natural control mechanisms have also evolved which help to keep outbreaks from seriously damaging forested areas. One mechanism that causes population collapse is starvation induced by the caterpillars' feeding. During the early stages of an outbreak, the trees have enough foliage to support the increasing number of caterpillars. After a year or two of complete defoliation, the large number of caterpillars need more foliage than is available. Starvation typically kills 75-95% of the caterpillars. Late spring frosts that defoliate the trees have much the same effect. However, frosts hard enough to cause defoliation to different tree species at the same time are not common. Defoliating frosts force the young caterpillars to wait 7-10 days for re-leafing. Frost is the only factor that causes a collapse during the first few years of an outbreak.

Another significant natural control occurs near the end of the outbreak cycle. Native flies, *Sarcofaga aldrichi*, kill many FTC pupae in their cocoons. Although this non-biting fly often plays a significant role in the collapse of an outbreak, fly populations often increase to the point that it also becomes a nuisance. Bacterial and virus diseases also become important late in the outbreak cycle. This is commonly due to the weakened state of the larvae as starvation begins, and is enhanced by the constant contact of the larvae with each other. Cool, wet spring weather also plays a role by slowing the development rate of the insects while aiding disease transmission.

INSECTICIDE TREATMENTS

The forest tent caterpillar rarely causes severe damage to trees and, as a result, the forest does not normally need the protection of pesticides. The Department of Natural Resources generally restricts insecticide-spraying operations on state lands to outbreaks that pose a serious danger to the survival of the forest. The FTC is a native insect, and a part of a natural and balanced ecosystem. Natural control systems cause the collapse of populations. As a result, the DNR does not spray FTC on public lands except for nuisance control in areas of concentrated recreational use.

Private landowners may desire and justify spraying to protect the leaves and preserve aesthetics. In making this decision the landowner should consider goals and environmental concerns. The DNR provides technical advice to landowners and landowner groups wanting to undertake control programs. Advice includes evaluation of alternatives, pesticide selection, spray timing, and contracting.

Insecticide treatments can be effective against the FTC. When applied while the caterpillars are small, insecticides can protect the foliage and the aesthetics of an area. It is difficult to achieve satisfactory control with the aerial application of insecticides on areas smaller than 10 acres or where less than 80% of the forested area will be treated. Several insecticides are registered for controlling the FTC. This includes chemicals such as malathion, carbaryl and acephate along with the biological insecticide *Bacillus thuringiensis* (also known as *Bt*). The DNR recommends the use of Bt because of its environmental safety. Bt is a naturally occurring bacterium that is effective only against caterpillars and is registered as an insecticide by several companies. Only caterpillars feeding on leaves sprayed with Bt are affected. Spraying Bt on caterpillars will not harm them. It has no effect on other insects, birds, people, and other animals.