Forest Insect
& Disease
Leaflet
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Forest Tent Caterpillar

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The forest tent caterpillar (*Malacosoma disstria* Hubner)[3] may be found throughout the United States and Canada wherever hardwoods grow. It is a native insect that has attracted attention since colonial times. Regionwide outbreaks have occurred at intervals varying from 6 to 16 years in northern areas. Southern gum forests in southwest Alabama and southern Louisiana have had continuous infestations, especially in water tupelo "ponds," since 1948. Here, varying degrees of defoliation occur annually in 3.5 million acres (1.4 million hectares) of gum forests.

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Hosts

The favored hosts of this insect are broadleaved trees: in the Northeast, sugar maple and aspens; in the Lake States, quaking aspen and oaks; in the Appalachians and in the Central States, oaks; in the Midsouth and in southern coastal States, water tupelo, sweetgum, and swamp blackgum; in the Mississippi Valley, cottonwood and elms; in Texas, oaks; and in the Northwest, red alder and willow. Other tree species fed upon include birch, cherry, basswood, and ash. Species not fed upon are red maple, sycamore, and most conifers. After they have

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Figure 1.—Forest tent caterpillars strip the leaves of aspen trees over extensive areas in the Lake States and the Northeast.

stripped trees, the caterpillars feed on wild and ornamental shrubs and even the leaves of cultivated fruits and vegetables.

Injury

The forest tent caterpillar often defoliates extensive areas (fig. 1). Outbreaks in the Lake States typically last for 3 years, then subside. Diameter growth may be reduced as much as 90 percent. Such defoliation kills few trees except for those that are suppressed. Unusual outbreaks lasting 5 to 7 years have caused mortality up to 59 percent where aspen grew over a high water table. Water tupelo in southwest Alabama subjected to annual defoliation for nearly 20 years grew only .05 inch (1.3 mm) in diameter per year on the average. This represents approximately 25 percent of that normally expected. Sweetgums in adjacent areas began dying after three successive defoliations. Tree flowers may be eaten (fig. 2), nectar gathering by honeybees may be reduced, and seed production is diminished. During years when larvae hatch before leaves unfold, caterpillars mine buds. The quantity and quality of sugar maple sap are greatly reduced as a result of defoliation. New foliage appearing after spring defoliation may be stunted and thin.

An average of 19 egg masses on an aspen tree 6 inches (15 cm) in diameter indicates that complete defoliation could occur. Similar relationships between the number of egg masses and defoliation apply to the southern tupelo-gum forest.

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Figure 2.—Forest tent caterpillars eat the flowers of water tupelo trees and reduce seed yield.

Life History and Description

There is one generation a year. Young larvae appear when the leaves are beginning to unfold. The time varies with weather and locality. Newly hatched larvae are nearly uniformly black, are less than one-eighth of an inch (3 mm) long, and bear conspicuous hairs. Colonies stay together and move about in a file, following silk trails laid down by leaders (fig. 3). With each successive molt, markings of pale bluish lines along the sides of a brownish body and a row of footprint-shaped, whitish spots on a black background become more evident (see cover). When full grown, caterpillars are about 2 inches (50 mm) long.

The caterpillars do not spin a tent; instead, they form a silken mat on the trunk or branch, and here they congregate when at rest or during molting periods (fig. 4). During the early instars, these congregations are usually in the upper part of the tree; later they are more commonly found lower in the crown and on the trunk.

Larvae usually pass through five instars. When high populations result in complete tree defoliation, the fourth and fifth instars often move around a great deal in search of food. The larvae wander in search of suitable sites for spinning cocoons, and their movements have caused them to be called "armyworms" by some.

Five to 6 weeks after hatching, the larvae spin cocoons of silk colored yellow by a powdery

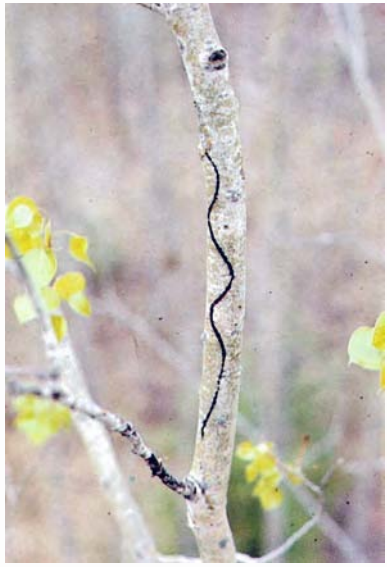

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Figure 3.—Third-instar larvae moving in a column up the stem of a quaking aspen tree.

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Figure 4.—Fifth-instar larvae at rest on an aspen trunk.

material dispersed between the strands (fig. 5). They are constructed in a folded leaf (fig. 6), bark crevice, or other sheltered place. In these cocoons, the larvae change to pupae. The stout-bodied moths, which emerge about 10 days later, live for only a few days. They are buff-colored and have a wingspan of

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Figure 5.—Cocoon of silk colored yellow by powdery material among the strands. (Photo by J. D. Harper, Auburn University)

1 to 1½ inches (25–38 mm). The forewings have two darker oblique lines near the middle (fig. 7). Strong winds can carry the moths many miles, and great numbers are attracted to lights.

The eggs are laid mostly on upper-crown branches in masses of 100 to 350, which encircle small twigs. Each mass is cylindrical with truncated ends (fig. 8). The eggs are cemented together and are coated with a frothy, glue-like substance, which hardens and turns a glossy dark brown. Within 3 weeks the embryos develop into larvae that overwinter in the eggs and hatch in the spring.

Control

In some years hatch is low. High mortality of larvae in the egg is associated with temperatures below –42° F (–41° C). Freezing weather just prior to, during, and following hatching kill many of the young caterpillars. When trees are completely stripped of leaves, larvae starve. In the North, temperatures above 100° F (38° C)

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Figure 6.—Red maples leaves, fastened together with silk, shelter new cocoons of the forest tent caterpillar.

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Figure 7.—Forest tent caterpillar moths are buff-colored, with two darker oblique bands on the forewings. (Photo by J. D. Harper, Auburn Universtiy)

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Figure 8.—Egg clusters encircle small twigs: Upper—before hatching, and lower—after hatching.

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Figure 9.—During outbreaks of the forest tent caterpillar, *Sarcophaga aldrichi* become extremely abundant and annoying.

in the shade during moth emergence and egg laying have caused death of adults and low viability of eggs.

Several species of flies and wasps parasitize the eggs, larvae, and pupae of the forest tent caterpillar. Most important are large gray flies, *Sarcophaga aldrichi* Parker, in the North; and *S. houghi* Aldrich in the South. Female flies deposit maggots on cocoons. The maggots penetrate the silk and move into the prepupae or pupae, killing them as well as any other parasites that may be present. *S. aldrichi* becomes extremely abundant and contributes greatly to the termination of outbreaks of the caterpillars in aspen forests. Although the flies do not bite, they annoy people by lighting on them (fig. 9) and regurgitating on clothing and laundry hung outdoors. In southern gum forests, *S. houghi* is much less conspicuous and usually goes unnoticed. Nevertheless, it can be an important control agent. *Itoplectis conquisitor* (Say) is an important ichneumonid wasp parasitoid of the pupal stage. Parasitization up to 20 percent by five species of egg wasps has been recorded in Alabama.

Predatory beetles, ants, true bugs, spiders, birds, and small animals feed on caterpillars and pupae, but it is not known to what extent they affect populations of the forest tent caterpillar. Annual flooding of water tupelo forests in Alabama and

Louisiana during the feeding period of the caterpillars (fig. 10) prevents the buildup of some natural control agents.

Polyhedral virus diseases often destroy large numbers of caterpillars (fig. 11). A fungus disease, *Entomophthora* sp., is common in the South, and a protozoan infects larvae in the North.

Small trees can be protected by collecting and destroying egg masses, destroying colonies of young larvae at the end of branches, or killing larvae clustered on the trunks of branches during molting and resting periods. Several chemical insecticides and a microbial insecticide, *Bacillus thuringiensis*, are registered for control of this insect (fig. 12). If control is necessary, consult a State or Federal pest-control specialist for the most up-to-date information.

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Figure 10.—Flooding of tupelo swamps during the larval feeding period prevents natural enemies from reaching the forest tent caterpillars.

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Figure 11.—Virus-killed caterpillars characteristically hang head downward.

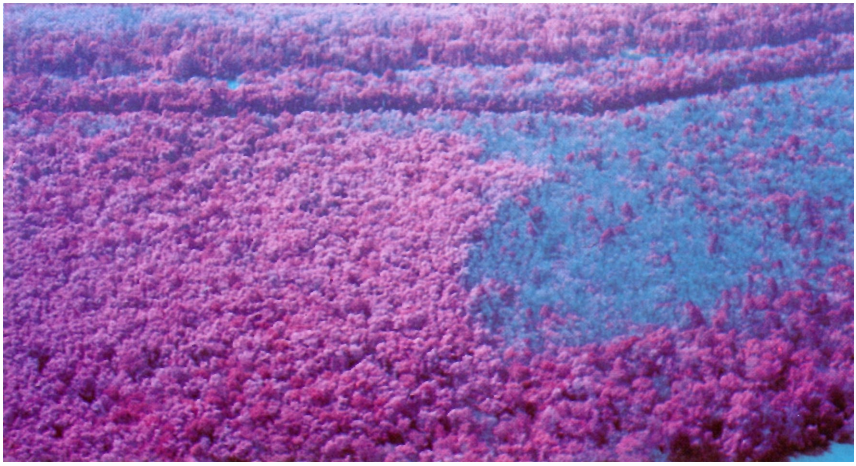

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Figure 12.—The area in the red portion of this infrared photo was sprayed to kill forest tent caterpillar larvae. The unsprayed blue area was completely defoliated. The red area along the river in the lower right contains non-host tree species.

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