



Pest e-alerts



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Tent Caterpillars Will Be Emerging Soon

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Despite the wintry weather that has hit much of Oklahoma this week, some of our early spring insect pests of ornamental plants will be emerging next month. Pests to watch out for include tent caterpillars, which are arguably some of nature's most spectacular leaf feeders. In terms of sheer volume of leaf material consumed per acre, tent caterpillars inflict a broader and more intense impact on forests and other landscapes. This is especially true during outbreak years when caterpillar populations achieve extremely high densities and we witness widespread defoliation of deciduous shade trees. In this article, I will discuss the biology of several important species of tent caterpillars in the western/southwestern U.S. and offer management options for limiting their damage in production and ornamental landscapes.

Identification, Host Preference, and Life Cycle

Several closely related species of tent caterpillar occur in the western region of the United States and all are native to North America. Common species include eastern tent caterpillar (*Malacosoma americanum*), forest tent caterpillar (*M. disstria*), western tent caterpillar (*M. californicum*), Sonoran tent caterpillar (*M. tigris*), southwestern tent caterpillar (*M. incurvum*), and Pacific tent caterpillar (*M. constrictum*). Tent caterpillars are generally hairy and reach about two inches in length when fully grown. Species are distinguished by coloration and markings on the body, size and shape of the tent, and occasionally by the host plant.

Two tent caterpillar species are of concern in Oklahoma: eastern tent caterpillar and forest tent caterpillar. Despite its common name, eastern tent caterpillar can be found as far west as the Rocky Mountains feeding on cherry, plum, crabapple, and occasionally non-fruit trees such as poplar, willow, and birch. Mature larvae are mostly black with a white stripe running down the middle of the back and several bluish-black spots on the sides (Fig. 1). Forest tent caterpillar is perhaps the most damaging tent caterpillar in North America because it is the most widespread and feeds on many hardwood species. Forest tent caterpillar is commonly encountered throughout the United States wherever hardwoods grow. Mature larvae are blue with a series of "keyhole"-shaped markings running down the middle of the back (Fig. 2). A third species of lesser importance, western tent caterpillar, occurs rarely in western Oklahoma. This species

feeds primarily on wild hosts but will occasionally feed on plum, other fruit trees, willow, and several other deciduous woody plants. Western tent caterpillar is only slightly hairy (relative to other tent caterpillar species) and has a light brown coloration with powdery blue markings along the sides of the body and a blue head.

Fig 1. Eastern tent caterpillar.



Fig 2. Forest tent caterpillar.



In general, the life cycle of tent caterpillars is similar across species, although slight differences exist. Tent caterpillars overwinter as eggs that are laid together in small masses and “glued” to twigs and small branches of the host plant (Fig. 3). Egg masses are seen easily in winter when leaves are absent. Eggs hatch in early spring and larval emergence coincides with bud break of the host plant. Thus, tent caterpillars are finely tuned to the availability of a nitrogen-rich food source. In spring, tent caterpillars hatch and congregate with most species forming silken tents within the crotches of tree branches (Fig. 4). These tents afford the caterpillars shelter from most natural enemies (predators and parasites). Forest tent caterpillars are one exception to the rule—they do not form tents but instead weave lightly spun, silken mats on trunks and limbs in which they rest during the day. Tent caterpillars are most active at night, venturing out from their silk shelters to feed on foliage. Tent caterpillars develop through five instars (distinct growth stages separated by molts). Tents expand as the insects grow. Fully grown tent caterpillars eventually wander in search of a place to pupate. They may spin cocoons on natural or artificial structures; during outbreaks large numbers of caterpillars can be found crawling on homes and other buildings. Adult moths emerge in early to mid summer and mate at night. Adults are often attracted to lights at night. Mated females lay egg masses on host trees in mid to late summer. There is one generation per year.



Fig 3. Forest tent caterpillar egg masses. (Photo credit: Herbert A. 'Joe' Pase III, Texas Forest Service, Bugwood.org)



Fig 4. Eastern tent caterpillar nest (Photo credit: Tim Tigner, Virginia Department of Forestry, Bugwood.org)

Management

During outbreaks, eastern and forest tent caterpillars can defoliate wide swaths of forest habitat in a short time. Even in non-outbreak years tent caterpillars can cause enough damage to warrant control. Although several natural enemies attack tent caterpillars, predators and



parasites cannot provide sufficient control of large caterpillar populations. Therefore, cultural and chemical control options are most often relied upon for management of tent caterpillars.

Cultural control techniques include the physical removal and destruction of egg masses or larvae. During winter, trees can be inspected for the presence of egg masses, which should be pruned out or otherwise destroyed before egg hatch. While impractical for large trees, removal of egg masses can be highly effective for protecting small landscape or nursery trees. Similarly, tents containing caterpillars can be removed and destroyed by hand. For tents located in upper branches, use a long pole with nails protruding from the end to remove and destroy the tent. For safety considerations and health of the tree, I strongly discourage the use of fire to destroy tents within a tree.

Chemical control efforts must target the larvae. A variety of insecticides are available for tent caterpillar control, including some over-the-counter products for homeowner use (Table 1). Always read the label before applying any pesticide because some host plants may be susceptible to certain products. Some insecticides labeled for caterpillar control contain “reduced risk” materials such as *Bacillus thuringiensis* var. *kurstaki* (Btk) or spinosad. Both active ingredients occur in nature—Btk is a bacterium that produces a toxin specifically active against caterpillars and spinosad is derived from the fermentation product of another microorganism. These active ingredients are considered reduced risk because they are generally safe to handle and cause minimal harm to non-target organisms if applied according to the label. However, Btk and spinosad are only effective against small larvae, so the application must be correctly timed with peak populations of young caterpillars. Thus, host trees breaking bud in March should be inspected for small caterpillars and tents, especially at sites with a history of these pests. Both Btk and spinosad must be ingested and do not provide quick knockdown of caterpillars like most contact insecticides. Thus, patience is the key! Larger larvae can be controlled with old standbys like carbaryl (Sevin). A new product, Acelepryn[®], has recently become available to commercial applicators and is labeled for caterpillar control. The active ingredient, chlorantraniliprole, offers a novel mode of action and is also categorized as reduced risk. In fact, EPA does not require a signal word on the label! Although expensive, I’ve seen a small amount of Acelepryn[®] go a long way for managing many caterpillar pests including tent caterpillars.

Table 1. Homeowner products available for tent caterpillar control in Oklahoma.

Active Ingredient	Trade Name (ex.)	Comments
Acephate + fenbutatin- oxide	Ortho Systemic Insect Killer Concentrate	Do not use acephate products on American elm, crabapple, red or sugar maple, cottonwood, redbud, or weigelia
<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> (Btk)	Thuricide Bt or Dipel	Apply to foliage; must be consumed by caterpillars; not effective against sawfly larvae
Carbaryl	GardenTech Sevin	Read label carefully for restrictions
Esfenvalerate	Ortho Bug-B-Gone Max Garden and Landscape Insect Killer	
Insecticidal soap	Safer Insect Killing Soap Concentrate II	Read label carefully for phytotoxicity information
Malathion	Green Light 50% Malathion Insect Spray	Read label carefully for phytotoxicity information
Neem oil	Safer Bioneem or Bonide Bon-Neem	
Spinosad	Ferti-Lome Borer, Bagworm, Leafminer and Tent Caterpillar Spray	Apply to foliage; must be consumed by caterpillars

Disclaimer: Oklahoma State University does not endorse any product and products mentioned in this article are intended for informational purposes only. Read labels carefully and apply listed products strictly according to label directions.

Nursery stock and newly established landscape trees will need protection from tent caterpillars to retain marketability and reduce stress, respectively. In other situations, however, control is not always warranted. Small populations of tent caterpillar can be tolerated in some ornamental or natural landscapes. Unlike exotic, invasive tree pests that rightfully garner a lot of media attention, tent caterpillars are native to North America and, thus, are part of the natural forest cycle. Complete defoliation isn't common under non-outbreak conditions and deciduous trees, if healthy, are remarkably resilient to repeat defoliation events. If trees weren't adapted to leaf-feeding insects like tent caterpillars, you can sure bet there'd be a lot fewer of them around today!

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