

Woodland Health

A column focusing on topics that might limit the health, vigor and productivity of our private or public woodlands

COORDINATED BY MARK WHITMORE

BACK SO SOON?

BY DYLAN PARRY

Got the blues again? Although it seems like the last outbreak just ended, forest tent caterpillar populations are on the rise across the Northeast. In fact, the last outbreak ended in 2006 for most afflicted areas of northern New York (2011 for the Southern Tier) and after 12 years, we were due for another population upswing. Going back into the 1880's, outbreaks have occurred about once a decade in New York with a few longer absences interspersed in the historical record. People have short memories though, and the sight of defoliated forests and millions of the hungry distinctive bluish caterpillars crawling everywhere always elicits great concern.

Populations of forest tent caterpillar reached outbreak densities across the Northeast last year with nearly 10,000 acres defoliated across New Hampshire and another 25,000 in Vermont. In New York, some of the first patches of defoliation were evident near Black Lake and along the Oswegatchie River in 2016, close to some of the first hit

sites in the 2002-2007 outbreak in the North Country. In 2017, the outbreak expanded with tracts of defoliated trees visible in several areas of St. Lawrence County as well as the eastern side of the Adirondack Park. Predicting the duration and extent of an outbreak is impossible, and whether this outbreak will be like the last one, the largest in more than 50 years, or the more typical smaller regional outbreak is anyone's guess.

It is important to recognize that the forest tent caterpillar is a native insect and the cycles of abundance and collapse are a natural component of a variety of northern hardwood and temperate deciduous forest types. In natural forests, it plays an important role, essentially thinning from below as the stress of defoliation eliminates suppressed and unhealthy trees. In managed stands, however, the effects of defoliation can interfere with many short and long term silvicultural objectives. Research has shown that forest tent caterpillar has profound effects on the growth of trees,

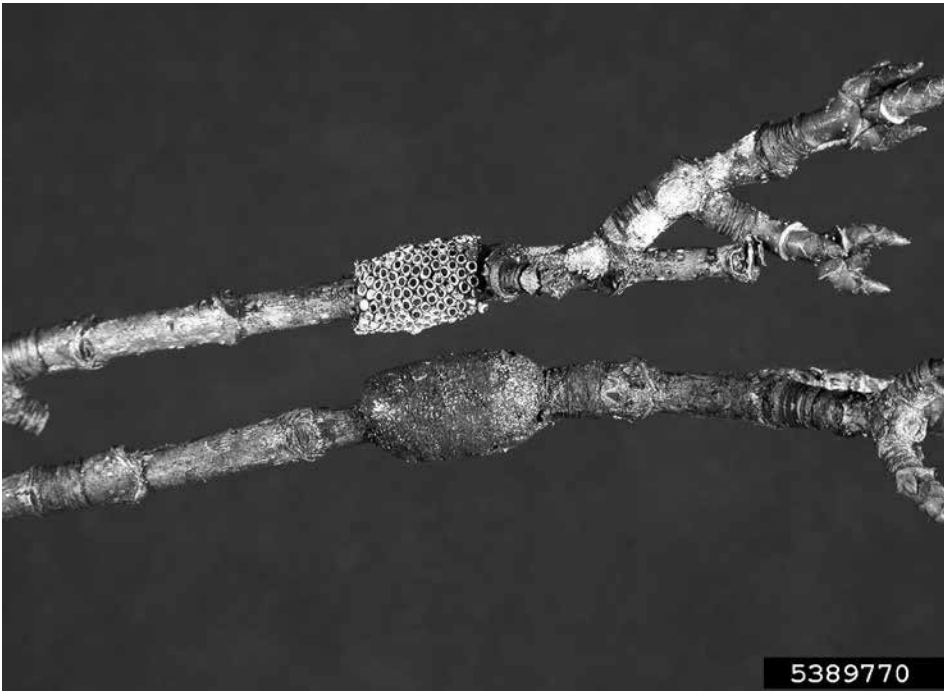
on competitive interactions between tree species, tree growth and mortality, nutrient cycling, and stand structure. Thus, consideration of preexisting stand conditions, site quality, species composition, and the landowner's ultimate goals are important in deciding whether a hands-off or more intervention oriented approach is warranted.

Should landowners be worried and what can or should they do? That is a tough question and depends on a lot of factors. The first thing to consider is that healthy hardwood trees are remarkably resilient to even severe defoliation episodes. On a good site, a healthy stand can withstand a single or even two consecutive years of complete defoliation with little long-term effect. Hardwood trees refoliate after leaf loss by breaking dormant buds and producing a second set of leaves. This is physiologically expensive as the tree is utilizing stored resources and diameter and height growth are reduced as the tree allocates resources to refoilation. Most trees will have some minor branch dieback following defoliation and suppressed or already unhealthy trees may die, although overall stand health is often little changed when measured after an outbreak subsides. On the other hand, when defoliation is coupled with additional stress factors such as drought and/or poor site quality, or when defoliation events occur for several years in succession, stand health can deteriorate rapidly. This year at least, most of the state received plenty of precipitation which should buffer trees against some of the negative effects of defoliation.

A longstanding question is the effects of forest tent caterpillar on maple syrup production. Surprisingly little research has been conducted on how defoliation affects either the quality or quantity produced. Defoliation reduces the production of current year resources and requires that the tree draw on reserves, which suggests that it must have some impact on syrup. An apt analogy might be withdrawing money from a retirement account to pay for house repairs. A good recommendation is that regardless of pre-defoliation stand health,



Forest Tent Caterpillar egg masses. Herbert A. 'Joe' Pase III, Texas A&M Forest Service, Bugwood.org



Forest Tent Caterpillar egg masses. Top egg mass is old and larvae have already emerged. Bottom egg mass is fresh and what you need to look for with a winter egg mass survey.
 Ronald S. Kelley, Vermont Department of Forests, Parks and Recreation, Bugwood.org

forest owners should avoid inflicting any additional stress such as thinning or selective harvest until after the outbreak subsides. Trees undergoing defoliation have reduced capacity to recover from wounding whether it is from logging equipment or tap holes for syrup production. Management options for forest tent caterpillar are limited, in large part because of the spatial scale of outbreaks. It is certainly possible to protect small areas of high value trees for economic or aesthetic reasons (campgrounds or sugar bushes for example) but over larger areas, costs become prohibitive. Several insecticides are licensed for tent caterpillar control although success is often equivocal. For sugar bushes used for syrup production, only the biological agent *Bacillus thuringiensis* 'Bt' is registered. Although Bt, a microbial product derived from a bacterium, can work well, it has a relatively short window of efficacy. Bt is not a contact insecticide, caterpillars must ingest sprayed leaves, after which they will stop feeding and die. The challenge is that the larger caterpillars get, the more resistant they become. However, because they initiate feeding very early and often have devel-

oped considerably by mining the buds and feeding on newly emerged foliage, they have already grown significantly by the time leaves are large enough to effectively hold the spray droplets (~25% expanded). Spraying is also dependent on rain free periods of 48 hours or more, further decreasing the opportunity for application. In smaller treated areas (sugar bushes), wandering caterpillars may move into sprayed areas from adjacent untreated forests later in the season and re-infest stands protected earlier.

Deciding on a course of action is dependent on the short and long term management objectives for the forest. Predicting whether a given tract of land will be defoliated is a critical part of that decision making. For forest tent caterpillar, a sequential sampling method has been developed for predicting the likelihood that a stand will incur significant defoliation. The state of Vermont has been very proactive in providing information and tools to forest property owners in anticipation of the latest forest tent caterpillar outbreak. The VT Department of Forests, Parks, and Recreation provides a succinct guide to the sequential sampling technique at

http://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Forest_Health/Library/Forest%20Tent%20Caterpillar%20Egg%20Mass%20Survey%20Instructions.pdf. The process requires a spotting scope or very good quality binoculars as you must be able to count egg masses on 30" branch sections in the upper crown of sugar maple and determine if they are new (will hatch in the spring) or old (hatched the previous year). It is not a difficult technique, but does require a little patience and practice. Sequential sampling can be conducted any time after the leaves fall. Although not perfect, it can provide a reasonable estimate of the probability of defoliation occurring and can help the landowner make management decisions.

An important consideration is that forest tent caterpillar outbreaks are usually short-lived at any given location and typically consist of a year of light defoliation as the population builds, a year of heavy defoliation and then a decline in the local population as natural enemies proliferate (diseases such as the Nuclear Polyhedrosis Virus (NPV) virus and the fungus *Furia gastropachae*, and parasitic insects, especially the so-called 'friendly fly', the large, annoying gray-striped flies which attack the cocoons) and stress from food limitation reduces the population. Thus, spraying the area may not necessarily provide any significant advantages as the population may be declining anyway. On the other hand, if your forest has already been defoliated once, careful sequential sampling for egg masses is prudent as a second successive defoliation significantly increases the probability of dieback, decline, and whole tree mortality. So if you don't want to be singing the tent caterpillar blues next spring, invest some time in examining your trees for egg masses this fall or winter. 🌲

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