



Tree Conservation Notes

Athens-Clarke County Community Tree Program

Black Dotted Brown Moth

Athens is experiencing its fourth year of significant infestation by the black dotted brown moth (*Cissusa spadix*). The caterpillar of this moth spends much of the early spring feeding on post oak (*Quercus stellata*), white oak (*Quercus alba*), swamp chestnut oak (*Quercus michauxii*), and bur oak (*Quercus macrocarpa*). Complete canopy defoliation has been observed in areas with high caterpillar densities. Originally documented in east Athens, the range for outbreaks has significantly expanded to include Clarke, Jackson, Madison, Oglethorpe, and Oconee Counties as well as a few reported infestations in the Atlanta area. Recent surveys have also indicated a similar pest called the common oak worm (*Phoberia atomaris*) is causing comparable damage in our oak trees. Since both species are so similar in their larval state, we recommend that they be treated in a similar manner.

History and Life Cycle

Little is known about the black dotted brown moth. While it has always been part of the native ecosystem in the Eastern United States there are no recorded outbreaks with the scale and duration that we are observing now. In 2011, South Carolina, Texas, and Ohio reported an increase in black dotted brown moth damage. It is unusual for outbreaks of this nature to continue for this period of time before a natural control—such as a virus or parasitic wasp—reduces the population of the pest.



Pictures of the adult moth and the damaging larvae.

It is unknown where black dotted brown moths lay their eggs. In all likelihood, it is in close proximity to the host species of oaks. In early spring—typically timed with leaf

emergence—the caterpillars emerge and begin feeding on the host trees. Because they are nocturnal, the caterpillars spend at least a portion of the daylight hours sheltering in the organic layer beneath the tree. In the evenings, the caterpillars ascend into the canopy of the host tree and feed of the leaves. In the mornings, the caterpillars return from the canopies for protection. The caterpillars may choose to hide beneath loose plates of white oak bark instead of returning all the way to the forest floor. Once they mature, the caterpillars spend the winter in a dormant pupal state until they can emerge as adults in the spring and begin the reproduction process. This moth only has one generation per year, so damage to the host trees is limited to the early to mid spring.

Signs of Infestation

Typically, post oak owners notice the infestation when the tree experiences a rapid and nearly-complete defoliation. Post oak appears to be the preferred host species for the black dotted brown moth. White oak owners tend to notice the unusual loss of bark plates from the tree. This occurs when squirrels and birds remove the plates from the tree to feed upon the caterpillars that are sheltered beneath them. While it may appear to be damaging to the tree, it is harmless and a good indicator of biological control in the area. Other property owners have been invaded by the inchworm-like caterpillars when they try to seek shelter in the adjacent home. The caterpillar is known to excrete reddish-brown liquid when disturbed. Other owners have been alerted to the infestation when large amounts of frass (insect excrement) begin to accumulate on porches and sidewalks beneath the trees.



The removal of bark plates and leaf feeding are very common signs of infestation.

Control

For otherwise healthy trees, the first year of an infestation can generally be ignored. The trees establish new leaves when the caterpillars stop feeding and are only moderately stressed by the early defoliation. Owners monitoring early infestations may choose to provide supplemental watering and fertilization—as determined by a soil analysis—later in the summer. It is important not to over-fertilize the tree, as increased nitrogen may make the tree more appealing for consumption.

Early infestations in the second and third years can be reduced using the bacterial insecticide *Bacillus thuringiensis* (Bt) which is commonly sold under the names of Dipel or Thuricide. The advantage to this application is that it is harmful to caterpillars and completely harmless to other insects, wildlife, pets, and humans. Bt produces a toxic crystal when it reproduces in the digestive systems of caterpillars. Although it is most effective when consumed by the caterpillars, there have been successful applications that are applied over the caterpillars. Bt is applied as a spray application that should cover all of the ground beneath the canopy of the tree and as much of the trunk and lower branches as can be reached with a ground-based application. Bt applications are most effective when the juvenile caterpillars are present in the first two weeks of April. A second application may be needed to further reduce the caterpillar populations. All spray insecticides are most effective when applied when the caterpillars are ascending the trees in the evening.



A stronger insecticidal application may want to be considered by homeowners with specimen trees experiencing their fourth year of defoliation or with previously damaged/stressed trees that are experiencing unwanted defoliation. The systemic insecticide Imidacloprid—commonly sold under the name Bayer Tree and Shrub Insect Control, Dominion, and Merit—can be applied to trees using a soil drench method. The tree will take the insecticide up where it will provide protection throughout the canopy of the trees. Since it takes several weeks to move throughout the tree, the insecticide will not control the current outbreak, but it will provide protection against future defoliation for up to five years. Although it is commonly used as a pet flea control treatment, Athens-Clarke County encourages homeowners to utilize caution when considering an application. Treatments should be applied exactly as listed in the directions. Since imidacloprid is non-selective, it should not be applied to multiple trees in a forested setting, but only to specimen trees of high-value. There is some research that indicates that insecticides like imidacloprid may be a contributing stress to bees and therefore play a part in Colony Collapse Disorder.

Tree banding can be a supportive control measure during any year of observed outbreak, as long as the band completely encircles the trunk of the tree. Two types of banding can be utilized. An adhesive band—such as one treated with Tanglefoot—can be placed around the trunk to capture caterpillars as they move up and down the trunk while feeding. Otherwise, barrier bands can be installed on the tree by securing a 12”

piece of burlap, saran wrap, or duct tape with a piece of rope or twine approximately 8" above the bottom of the barrier. With both banding methods, the bottom section of the band should be secured using duct tape to ensure the caterpillars do not bypass the band by crawling through bark crevices underneath it. All tree bands should be removed by July to ensure that they do not pose a girdling risk to the tree.



Barrier and sticky band applications can be an effective way to capture caterpillars as they ascend into the tree.

Recent anecdotal evidence indicates that a 3-5 inch band of Crisco can be placed around the trunk to provide a deterrent to the caterpillars climbing the trunk. Applications of Crisco should be thick enough to obscure the bark plates beneath the tree. The owner should also ensure that the Crisco is applied forcefully enough so there are no open voids beneath larger bark plates. Banding applications and the "Crisco method" work best when a tree's owner visits the tree on a daily basis to kill any of the entrapped caterpillars. Since the caterpillars are nocturnal, a visit to the tree right before bed will have a maximum effect on their populations. Crisco applications should be washed off by July.



Crisco provides a good physical deterrent.

It is likely that a combination of the methods listed above will be needed to control Black Dotted Brown Moth outbreaks. Non-systemic control methods must be applied within the first five weeks of oak tree bud break in order to be effective. It is important to remember that this is a native pest that the trees have had to deal with for centuries. Most trees are equipped to handle partial and periodic defoliations and the control methods should be carefully selected based upon a tree's age, location, condition, and history of infestation. We have already observed the infestations becoming less intense

with each passing year. We are hopeful that the forest ecosystem will produce biological controls that will begin to reduce black dotted brown moth populations back to ecologically sustainable levels.

References:

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For more information, contact the Athens-Clarke County Community Forestry Coordinator at (706)613-3561 voice, (706)613-3566 fax, or by e-mail at forester@athensclarkecounty.com