

Tiny wasps attack trees like 'incurable cancer'

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The tiny oak gall wasp is less than 1/16th of an inch long and resembles an amber drop of sap with eyes and a pair of wings. Cape Cod Times/Steve Heaslip

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BREWSTER — At 65, arborist Ted Brown has a lithe physique and nut-brown skin from decades of tree-climbing. He loves free-form dancing and practices yoga, frequently punctuating sentences with his hands clasped in a prayerful position that is both greeting and honor for the person, or subject, at hand.

Lately, his hand gestures betray worry, pain and frustration more akin to hand-wringing, because the trees he tends have been dying off mysteriously. Not slowly, but a quick, implacable death for large, seemingly healthy trees that are many decades old.

Brown used everything in his arsenal to cure the big oaks. He watered, fertilized, sprayed insecticides, injected fertilizer into the tree trunk. Nothing worked.

"I feel like I'm a doctor telling a patient they have an incurable cancer," Brown said.

This spring, people like Russ Norton, the Barnstable County horticulturist, and Timothy Boland, executive director at the Polly Hill Arboretum on Martha's Vineyard, have been fielding an increasing number of phone calls from arborists like Brown and concerned homeowners who couldn't understand why their trees were dying.

Of course, the winter moth caterpillar, a voracious alien invader that defoliates trees and can kill them, seemed a prime suspect. Thanks to a warm winter, the winter moths emerged from leaf litter around Thanksgiving in large numbers, said Barnstable County entomologist Larry Dapsis.

"Winter moths inflict a lot of stress on trees," said Dapsis. In the spring, the small inchworms of the winter moth can strip trees bare of leaves. It takes a lot of energy for trees to put out a second set of leaves and, if drought conditions exist or there are other environmental factors, trees could die if defoliation occurs over a two- or three-year period.

But the Cape dodged a big bullet when an especially dry and warm spring dried out the moth eggs before they could hatch.

But there was no evidence that leaves had even grown on the afflicted specimens Brown and others were seeing.

"On some of the trees, the lack of foliage is over 90 percent," said Norton. "It's pretty amazing when you see it."

Coastal areas of Falmouth, Yarmouthport and Brewster seem to be especially prone to this oak die-off, Norton said.

Aesthetically and economically, it can be devastating. These trees, which take a half century or more to reach their full height, are irreplaceable, and cost thousands of dollars each to remove. Even with stump grinding, it is difficult to replant the area, Brown said.

Standing in the backyard of one of his client's homes, Brown showed off a beautifully terraced landscape that unfolded from a large stone patio across a carefully manicured valley to a large screen house on the other side. A stone wall bordering a French-style ornamental garden detoured in a graceful arc around a big oak tree that should have been green as summer grass but was instead as brown and bare as winter.

Apart from the obvious absence of leaves, there were no apparent clues as to what killed the tree. When Brown lifted his binoculars to the dead crown of the afflicted tree, however, the damage was shockingly obvious. Each limb was swollen like arthritic fingers with growths known as galls.

Twig samples Brown collected showed the branches were riddled with small pinholes.

Inside these tunnels were tiny wasps, less than 1/16 of an inch long that resembled amber drops of sap with eyes and a pair of wings.

There are more than 700 species of gall-producing wasps in the U.S.

Bob Childs, an entomologist at the University of Massachusetts, believes the most likely culprit is what is commonly known as the crypt gall wasp, or *Bassettia ceropteroides*. Its life cycle is not well-known, except that females deposit eggs into the vascular system of the branches, where larva develop protected from predators by the woody branch itself and are fed by the tree.

Unlike other oak galls that don't harm the tree, the twig gall blocks the highways that feed nutrients and water to the leaves and branches and ends the exchange of sugars produced in the leaves that feed the rest of the tree.

The reason that one tree can be severely infected while its neighbor shows no signs of wasps is likely because of the narrow egg-laying window of 24 to 48 hours before tree buds break open. Once inside the branch, the wasps' saliva enters the tree's vascular system with a genetic message telling the tree to stop making leaves and start producing the woody material that forms the swollen protective gall.

"They are the original gene splicers," Childs said.

A similar outbreak occurred on Long Island in the early to mid-1990s and led to a decline in black oaks. At least one study showed that environmental stress such as defoliation and drought were important in determining how vulnerable trees were to the wasps.

Since many of the infested areas are located near the coast, one theory posits that defoliation from salt spray from big ocean storms may have weakened trees, or that there may be something in the soil composition in those areas. Another possibility being investigated is whether an opportunistic fungus might be exacerbating the damage caused by the wasps and finishing off the trees before they can recover.

"We don't know," said Norton. "One of the things we'd like to find out, but haven't found, is a predisposing factor like several years of defoliation, or drought or cankers of the trees."

For now, Cape and state researchers are looking to learn from those who attempted to fight the outbreak in New York.

Dapsis said there is some evidence that Connecticut forestry experts had some success in spraying the lower four feet of the trunk with an insecticide that is absorbed through tiny holes in the bark.

In theory, the poison is then taken up by the tree's vascular system and delivered directly to the wasp larvae, killing them.

"(The insecticide) has a long residual life," Dapsis said.

"A single application could buy a two- to three-year window."

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