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FOCUS ON FOREST HEALTH White Oak Decline, Not So Fine

Lane Gandee

In recent years, landowners in south-central Ohio have been noticing and reporting something alarming--white oak trees on their properties are dying and apparently are doing so rapidly. Service foresters and forest workers are reporting the same news coming out of southern state forests and even along the west-central section of the state (Figure 1). What could this menace plaguing our beloved white oaks be? Is there a new white oak borer that will demolish the species just like the emerald ash borer is doing to our ash trees? Relax, the answer is no. This is a syndrome called "White Oak Decline" and has happened in oak species before, and will likely happen again.

Oak decline is a general label given to a condition in which a complex of factors, working together, causes mortality in oak trees. It can happen to red, black, pin, chestnut, and scarlet oaks, but this particular event seems to be occurring on just white oak (*Quercus alba*). Historically, other species of trees including white pine, maples, birch, and American beech have encountered similar problems. Symptoms of this complex include crown dieback, epicormic branching, small leaf development, premature autumn color, and finally, death. (Figure 2). Why only white oaks are being affected this go around is a mystery that the ODNR Division of Forestry is currently trying to solve, along with help from pathologists with the US Forest Service, University of Maryland, and Ohio State University. We have rounded up and examined some suspects, but a smoking gun still eludes us. Still, there is no perfect crime, so it helps to look at biological and environmental factors affecting white oak and see if we can narrow it down.

Healthy trees in the forest have developed resistance to attackers and can ward off most pests with little consequence. But, when foreign invaders attack, trees have no defense and thus become quickly decimated. This, however, is not the case here. These trees, weakened by some environmental factor, have become vulnerable to attack from local bullies. So what we need to find is this weakening factor, or, as mentioned above, the proverbial smoking gun. But here is where the plot thickens because there may be more than one perpetrator. In fact, this mystery has more suspects than a late night game of Clue.

A tree has two ways to "eat," its leaves and its roots. Mess with one or both of these and the tree is in some serious trouble. With our trees, something is doing exactly that. Let's start with defoliating factors that these white oaks may have experienced. There have been recent occurrences of a jumping oak gall outbreak in 2009-10, late frost in April 2009, gypsy moth currently on the loose, ice storm of 2005, tent caterpillars and half

wing geometer outbreak in 2002, scarlet oak sawfly outbreak 1997, and so on. Not to mention record cold temperatures reaching -17° F in 2004, droughts in 1999 and 2002, and unreported localized events of which we are simply unaware. All of these things hold potential to seriously weaken white oak trees, and some are even white oak specialists. For the sake of this article, let's just assume our bad guy is indeed one of the causes listed above and our beautiful white oaks have thus become weakened. Will they now just slowly die and fade gently into the night? Well, if left alone to build back up their resources, no. They would likely recover. But in nature, when an organism is weak, there is always something around to exploit that weakness, and our treasured white oaks are no exception.

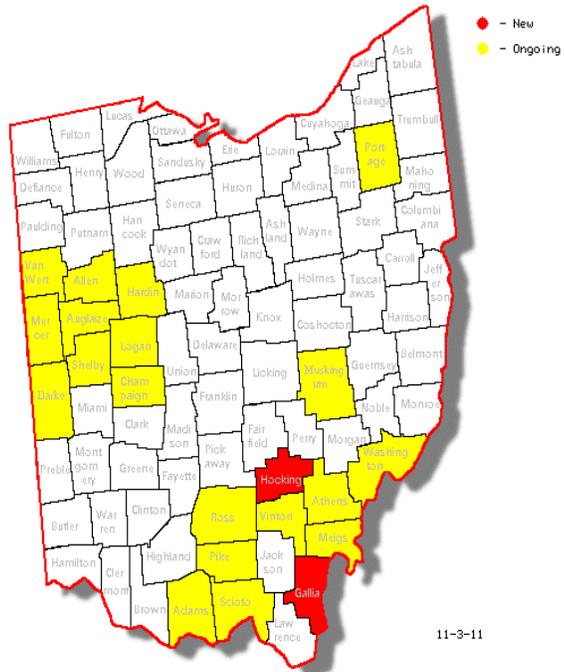
Enter stage left: two villains that have been lurking in the wings waiting for their chance to make an appearance. *Armillaria mellea*, or armillaria root rot as it is commonly known, is a naturally occurring fungus that usually lives on stumps and roots of dead trees. However, when it encounters the roots of weakened trees, it can attack them and eventually girdle the buttress root and root collar. This further weakens the trees and allows our second villain, the two lined chestnut borer (*Agrilis bilineatus*) to attack without mercy. This borer operates much like the emerald ash borer, with its larvae feeding in meandering galleries in the inner bark and outer heart wood. These galleries overlap and eventually cut off the food and water supply to the tree. The combination of both the fungus and the borer brings about rapid decline and death. Secondary consumers such as decay fungi and flat headed apple borers may then show up and feed on the now dead wood and start to break the tree down. This may be why some standing and apparently live trees seem to be partially decayed with fungi visible on their trunks.

Let me be perfectly clear here: these are generalities, and each instance needs to be evaluated on a per site basis. There are agents such as oak wilt which are caused by the fungus *Ceratocystis fagacearum*, and another called *Phytophthora cinnamomi* which will kill oak trees. These pests, however, don't limit themselves to just white oaks and would presumably be present in other oak species in a stand. Field investigations have not shown any other oak species affected besides white oak, and soil and root samples have not revealed the presence of these pathogens.

So, why are just white oaks affected? Well, that is the mystery the Ohio Division of Forestry and US Forest Service are currently working on. Again, it seems to be a complexity of various factors contributing to the decline and will warrant further investigation. Stay tuned.....

Lane Gandee served as interim forest health forester for the ODNR Division of Forestry in 2011.

Eastern Sudden White Oak Death (ESWOD) (white oak decline)



11-3-11

Figure 1. Sites reported showing white oak decline. Red counties are newly reported 2011 sites. Yellow is from 2009-2010. Map by ODNR.



Figure 2. White oak tree showing typical “white oak decline” symptoms.
Photo courtesy of Alan Iskra, USDA Forest Service.