Coping With Loss Part I:

Old age and insects are just some of the contributing factors to dying oak trees in Florida.

By Ed Barnard

Oak trees are dying in Florida. Oak trees have always been dying in Florida, and elsewhere. So what's all the hubbub?

Oak trees are a major component of Florida's forest, rural, and urban landscapes. People pay big money to establish and maintain oak shade trees in their yards. Some oak trees represent favorite family memories. Oak trees in Florida are important and loved. When they die, people get worried and upset. So why do they die, and what can we do about it?

Life Expectancy

First of all, oak trees are living things, and just like all other living things, oak trees have a life expectancy. That's right, just like we can expect something in the neighborhood of 70 to 75 years, oak trees have life expectancies ranging from decades to centuries, depending on what kind of tree one is considering. Laurel oaks and water oaks, for example, are geriatric senior citizens by the time they have reached 60 to 80 years of age. Live oaks, on the other hand, are mere youngsters at that age; they can expect to be around for 200 years or more. This is a reality that many fail to recognize when looking at the dying oak in their front yard. So, what kind of oak trees do you have? How old are they?

The Usual Suspects

The forgoing having been said, insects and diseases sometimes play a role in the death and dying of some oak trees. In some cases, diseases and insects may very well be important factors in the demise of oak trees. This is where things get complicated. Understanding how insects and diseases affect things as complex as trees is not an easy task. I'm a well-trained and experienced tree pathologist, and, in many instances, I remain puzzled by the timing and mode of oak tree mortality. There are, however, certain things that are recognizable causes of oak tree death. However, even these factors can be argued and interpreted in a variety of ways.

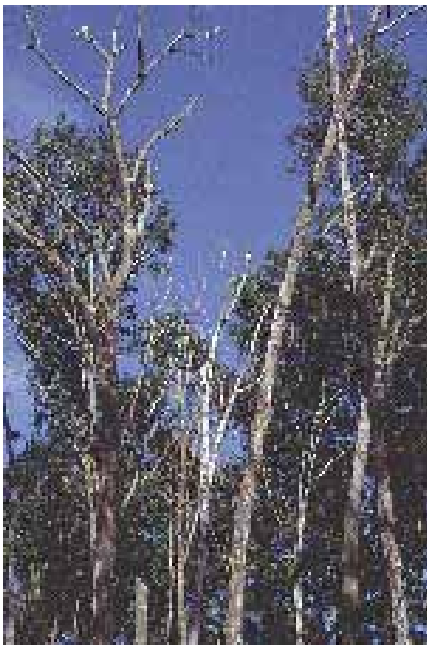
Let's start with a basic lesson in tree (in our case, oak tree) insect and disease relations. In nature, there are literally hundreds of organisms that live on or in forests and trees. Some of these organisms (insects and microorganisms like bacteria, viruses, and fungi) are totally harmless; some are even beneficial. Others are damaging pests or virulent pathogens (organisms capable of causing disease). Still others, while normally harmless, become damaging pests or threatening pathogens only when environmental conditions (drought, heat, floods, etc.) or injury (lightning, mechanical damage, site disturbance, etc.) predispose trees to infestation or infection. Given this brief background, let's think about some insects affecting oak trees in Florida.

Insect Invasion

Let's limit our consideration of insects to a few key groups. Defoliators are insects that feed on the foliage of trees. In Florida, there are several insects (often caterpillars, immature stages of moths) that periodically defoliate oaks on a grand scale. Among "Florida's finest" are the white marked tussock moth, the variable oak leaf caterpillar, and less frequently, the forest tent caterpillar. The resulting bare trees are scary and cause much concern. However, the

Photos courtesy of forestryimages.org

Defoliators such as the whitemarked tussock moth larva [left], the variable oak leaf caterpillar larva [center], and the forest tent caterpillar larvae [right] can be nuisances to oak trees.



Photos courtesy of Ed Barnard

Death of oaks in Florida has sometimes come in big numbers.

good news is that while defoliating insects can be really messy nuisances, they rarely, if ever, kill oak trees. Only if they repeatedly cause near total defoliation for several years in a row are they life-threatening in and of themselves.

Bark beetles (and there are oak bark beetles) bore into the inner bark of trees for purposes of mating and laying eggs. Their larvae feed on the inner bark creating characteristic gallery patterns and sometimes girdling trees before emerging as adults. Wood borers (usually beetles or the larvae of certain moths) are insects that bore into the xylem (wood) of their host trees. The feeding of these insects leaves "tunnels" in the wood. This all sounds worrisome, but the reality is that these insects (both bark beetles and wood borers) generally attack only trees that are under some kind of severe environmental stress, have sustained some major injury, or are already dead. They are not killers in their own right. ■

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Coping With Loss Part II

Diseases play varying roles in the death of oak trees in the Sunshine State.

By Ed Barnard

In Part I of this two-part discussion, we looked at old age and insects in relationship to oak tree mortality in Florida. In this follow-up article, we consider the known and unknown roles of diseases in the decline and death of Florida oaks.

Oaks in Florida are often infected with root disease pathogens (fungi with ugly scientific names like *Armillaria* and *Ganoderma*). In certain scenarios, these infections can be lethal. However, these organisms do not represent threatening epidemics. Such fungi are natural components of forest ecosystems and for the most part attack trees that are severely stressed or injured.

Fungi Facts

Armillaria and *Ganoderma* are pretty good scavengers, decaying old dead stumps and roots. If it weren't for fungi like these recycling the carbon and minerals in dead trees, we'd be up to our eyeballs (or deeper) in old dead woody debris. At certain times, Armillaria produces distinctive clusters of tan mushrooms on or near the bases of infected trees. These mushrooms are "gilled" underneath their caps. *Ganoderma* produces stalked or bracket-shaped "conks" on infected tree bases or roots. The caps of conks of *Ganoderma* species are often "varnished" (yellow-brown to reddish) on top and are poroid beneath. These spore-producing structures are helpful in the diagnostic process, but they are only present when environmental conditions are suitable.

Phytophthora species are a group of microscopic soil-borne fungi that have been associated with oak-root diseases in Florida as well. Their specific roles are not often clear, but they could be a factor in disease development. Again, the pathogenic potential of these fungi is strongly related to predisposing environmental conditions such as flooding and/or soil saturation. Some *Phytophthora* species have been in Florida for a long time. One species appears responsible for distinctive "bleeding" basal cankers on laurel oaks. Other species, such as the one responsible for sudden oak death in California and Oregon, are not native and so far have not become established in Florida.

More Suspects

Other organisms are known to infect oak trees in Florida. Among them are numerous foliage fungi, wood-decay fungi, and canker fungi (fungi that infect and kill the trees' inner bark and cambium tissues). While they do cause actual disease, deformities, or rot, none of these types of pathogens are aggressive killers of oaks. Perhaps the most highly visible "canker" fungi that affect oaks in Florida are species of *Hypoxylon*, now called *Biscogniauxia*. I place canker in quotations here because, in my judgment, these fungi do not act like true canker pathogens (just one of many

Basal bark "bleeding" can be a symptom of an oak tree infected with *Phytophthora cinnamomi*.

traditional "truths" I think are subject to challenge). *Hypoxylon* species typically show up on the stems of dead and dying oaks as distinctive black or silver-gray sheet-like crusts as the bark of the ailing trees sloughs off. These crusts are the spore-producing structures of the fungi. *Hypoxylon* species are native organisms that respond to a host tree's condition, attacking and causing disease only on trees that are subject to severe drought and/or other predisposing stress.

Tiny Troubles

Among the more subtle pathogenic infections that do or potentially could impact oaks in Florida are a group of diseases we collectively refer to as vascular wilts. Vascular wilts are diseases caused by microorganisms that colonize the tiny vessels (tubes) within the xylem (wood) of host trees, plugging up the water-conducting tissues and interrupting water flow through the trees. Some of these pathogens are vectored or transported by certain species of insects, and unlike many of the diseases discussed above, most vascular wilts are often lethal.

One vascular pathogen known to be present in Florida oaks is a bacterium called *Xylella fastidiosa*. This bacterium is widespread throughout the state, but its role in the decline and mortality of oaks is not well established.

Oak wilt, a specific fungal vascular wilt disease of oaks that has caused much oak mortality in Texas and parts of the northern U.S. is unknown in Florida. However, the potential for oak wilt to appear and the possibility that other vascular wilts could be active has given rise to a new initiative to assess vascular infections in oak populations throughout the state.

Time To Face Reality

So where does all this leave us? In short, lots of insects and microorganisms are active on or in oaks in Florida. Most of these organisms are native and natural, and are not causing oak mortality in and of themselves. We know of no epidemic threatening oaks in Florida. Oaks in Florida, like elsewhere, die for a variety of reasons. In many cases, more than one of these reasons are playing in concert. We do not have sudden oak death or oak wilt in Florida. Efforts are under way to evaluate possible new diseases that could be a factor in certain situations.

What should we do? Avoid unnecessary oak tree abuse (e.g., drastic grade changes, site disturbance, and tree injury during construction). Provide proper care for existing oaks; this in many cases means doing nothing. When pruning or trimming oaks, consult a competent tree care professional. ■

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