



FLORIDA FOREST SERVICE

Tree Pests and Diseases following a Hurricane

Leaflet Number 23

OVERVIEW

Hurricanes cause immediate and devastating damage to trees, often stripping off leaves, breaking trunks and branches, or uprooting entire trees. Following severe hurricanes, certain tree pests and diseases may become more prevalent. However, most of these are secondary issues and only affect trees that are stressed, dying, or recently dead. Though secondary pests and diseases do not affect trees that are otherwise healthy and vigorous, hurricane damage can stress trees for months or even years, leaving them vulnerable to a potential infestation following the storm.

Hurricane WIND Damage

In many cases, damage from hurricane winds is obvious and straightforward. **Bent, broken or uprooted trees** are immediately recognizable. However, sometimes wind damage is not immediately apparent. When stems bend and twist but do not break during a hurricane, it can cause **hidden damage** to the internal wood structures, including the vessels in the wood that carry water up from the roots. It is also possible for a tree to be partially uprooted and then settle back into place, leaving it with broken roots that no longer conduct water or provide structural support effectively. This hidden damage can lead to the decline and death of trees for months or even years.



Pictured: Bent, broken and uprooted trees caused by Hurricane Michael winds, October 2018.



Pictured: Young pines initially survived Hurricane Michael but began to die due to hidden wind damage and bark beetle infestations, June 2019.

Hurricane WATER Damage

Water damage from hurricanes is primarily due to **flooding** from rainfall and/or storm surge. Tree roots that are submerged for an extended period can suffocate and lose their ability to take up water. **Symptoms** are very similar to those found during a drought and include wilting or loss of leaves, branch dieback, and/or death of the entire tree. Damage caused by prolonged water inundation can occur even when there is no standing water on the site, if the soil is saturated, and/or if the water table is elevated for an extended period of time. This phenomenon is known as “**physiological drought**.” Different tree species vary greatly in their ability to tolerate and survive these conditions. Along the coastline, flooding from storm surge can cause the same effects, but the salt in the sea water can cause additional long-term problems for tree species that are not well-adapted to high salinity in the soil and water. Another way that water from hurricanes can injure trees is “**salt spray**,” when droplets of sea water are blown inland by high winds, causing leaves or needles of salt-sensitive tree species to turn brown and fall off, especially on the side of the tree facing the coast. In most cases, the tree will sprout new leaves and recover with no long-term effects.



Extended periods of flooding and soil saturation from heavy rains can lead to tree death for years after a hurricane.

TREE PESTS & DISEASES FOLLOWING A HURRICANE

PINE BARK BEETLES

Pine bark beetles, particularly **Ips pine engraver beetles** and **black turpentine beetles**, feed in the inner bark of pines that are stressed, declining, or recently dead. As a result, they are likely to be more abundant in the months and years following a hurricane. They are not likely to infest healthy trees but can smell the odors given off by stressed trees even when they have no visible problems. Typical **signs of attack** are small clumps of resin on the bark, known as **pitch tubes**, where the beetles tunnel in, reddish-brown boring dust, and rapid wilting of the needles. **Southern pine beetles** (SPB) are known to aggressively attack healthy trees during an outbreak, but SPB outbreaks are not likely to become more abundant following hurricanes and never occur in South Florida.



LEFT:
Pitch tubes caused by Ips
pine engraver beetles.

RIGHT:
Pitch tubes caused by black
turpentine beetles at the
base of a pine tree.



AMBROSIA BEETLES

Ambrosia beetles are tiny insects that tunnel directly into trees and carry with them a **symbiotic species of fungus** that serves as their food source. They don't eat the wood, so they push out **fine, light-colored wood dust** behind them as they tunnel in. This process can form delicate columns of **compacted sawdust** that stick out from the bark before crumbling and collecting at the base of the tree. When this type of sawdust is seen all around a tree, it is usually a sign the tree will not recover. Many species of ambrosia beetles are found in Florida. Some target conifers while others prefer hardwoods, and some infest both. Like pine bark beetles, most ambrosia beetles are not the primary cause of death and only infest trees that are already dead or are dying for another reason.



Compacted
sawdust at the
base of a tree
indicates
ambrosia beetle
infestation.



HYPOXYLON CANKER



This disease, which **only affects hardwood trees**, appears as areas of **flat fungal tissue** that push off the bark in patches. These **patches** vary in size, from a few inches to several feet in length, and can be grey, brown, or black in color. If it occurs on the main trunk, it generally means the tree is dead or dying and will not recover. If it appears on isolated branches, often only those branches will die. However, isolated branches can also be an early sign that the tree is in a general state of decline. There is no treatment except pruning infected branches and generally promoting good tree health. Tiny colonies of the fungi that cause hypoxylon canker are commonly present in living, healthy trees without causing any problems. Although, when the water content of the tree drops below a critical level, indicating that the tree is severely stressed or dying, the fungus will rapidly invade into the inner bark and the sapwood, killing and decaying these tissues as it spreads. Thus, hypoxylon canker is a disease that becomes more prevalent following major environmental stresses, such as the wind and flooding caused by hurricanes.

ROOT DISEASES

Root damage from **partial uprooting** or **water inundation** is an opportunity for root disease fungi to take hold. Once established, infections can gradually spread throughout the root system. A tree may not show any **above-ground symptoms** until up to half of its root system is dead, which can take several years. The **effects** may appear as gradual dieback of the twigs and branches or the sudden wilting and death of the entire crown as the tree becomes unable to supply its leaves with enough moisture from the soil. In some cases, the fungus may creep up from the roots and extend into the base, creating an area of decay known as "**root-butt rot**." There is no treatment, but an otherwise healthy tree can sometimes limit the spread of infection and survive. Different pathogens may be involved and some could form mushrooms, or shelf-like structures known as **conks**, on and around the base of the tree. Multiple conks is an indication that there is extensive decay present.

