

Understanding, Recognizing and Keeping Hypoxylon Canker of Oaks at Bay

Part 1. Cause and Biology

Hypoxylon canker is a tree disease appearing as a necrotic (dead) lesion on limbs, branches and trunks of affected trees. The canker develops just under the bark (Figure 1), but in advanced stages causes a white rot type of decay of the sapwood. For this reason, Hypoxylon canker not only contributes to tree mortality, but compromises the structural integrity of a tree making it a danger to life and property.

Fig 1. *Hypoxylon* beneath bark of disease tree.



The disease is caused by a fungus named *Biscogniauxia* (*Hypoxylon*) *atropunctatum*. This fungus is an opportunistic pathogen, meaning it does not affect healthy and vigorous trees. However, *Hypoxylon* can quickly colonize weakened or stressed trees. It has been diagnosed on trees growing in many different habitats, such as forest sites, pastures, parks, green spaces and urban development areas. Hypoxylon canker can affect any type of oak, including; black, blackjack, laurel, live, post, southern red, Texas red, water and white oaks.

Since *Hypoxylon* is a fungus, it spreads from diseased to healthy trees by spores. Opportunistic fungi, however, are usually already present on many trees, causing disease when tree resistance is insufficient to prevent them from infecting. There are many sources of stress capable of decreasing the resistance of trees to opportunistic pathogens.

Stress Factors

Urban development Many factors in urban environments stress trees. Construction damage, for example, wounds roots and causes site disruption that result in tree stress and decline. Constructing swimming pools, sidewalks, patios, and driveways can damage essential roots and root flares that provide necessary water and minerals for a healthy tree. Soil compaction and addition of fill soil cause drainage issues and suffocate roots. All these factors set in motion a chain of events leading to stress, decline and tree death (Figure 2). During decline, *Hypoxylon* attacks the trees and contributes to their mortality.



Fig 2. Typical site disruptions during home construction.

Natural factors Climatic conditions such as heat, drought, ice storms, hail damage, lightning, and flooding are capable of predisposing trees to infection by *Hypoxylon*. Insect attacks and other diseases, such as oak wilt and root rots, induce stress and cause a tree to be susceptible to infection by *Hypoxylon*.

Symptoms and Signs and Control of Hypoxylon canker are covered in **Parts 2** and **3** of these fact sheets.

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Part 2. Symptoms and Signs

Symptoms. As was described in Part 1 of this series (*Cause and Biology*), Hypoxylon Canker occurs in trees when they are stressed by environmental extremes. Trees in danger of succumbing to Hypoxylon canker therefore manifest all of the many symptoms typical of a declining tree (Figure 1). These symptoms include:

- Yellow, brown leaves,
- Small leaves and reduced twig growth,
- Thinning canopy,
- Dead limbs and branches,
- Epicormic shoots (water sprouts) growing on trunks and large limbs,
- Dieback of feeder roots,
- Sapwood in the cankered area becomes white and stringy.



Fig. 1. Declining trees at high risk to Hypoxylon canker.

Signs. As these symptoms in the tree progress, the outer bark falls from the tree to expose the causal fungus, called *Biscogniauxia (Hypoxylon) atropunctatum*. The signs of the fungus are:

→ (early stages) light to dark reddish brown to olive green colored crusty fungal (stroma) tissue over the cankered area (Figure 2),

→ (later stages) grey surface that eventually flakes off after 6 – 12 months to reveal a dark brown to black crusty material that gives a burnt appearance to the tree (Figure 2),

→ (advanced stages) the signs of the fungus may first appear as small patches a few inches in length, but will eventually merge to form large strips along the trunk and major limbs of the tree (Figure 2).

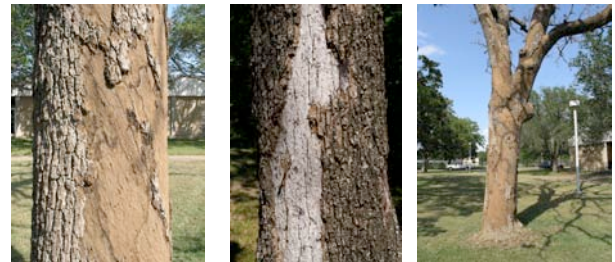


Fig 2. Stages of Hypoxylon canker.

Once Hypoxylon canker is evident, it is usually too late to try to save the tree. Large portions of the tree will be dead, reducing the desirability as a landscape specimen. In addition, the structural integrity of the wood is compromised and the tree becomes hazardous. Trees exhibiting signs and symptoms of Hypoxylon canker should be carefully inspected and considered for removal.

Control of Hypoxylon Canker depends on maintaining vigorous healthy trees by reducing stress and is discussed in **Part 3** of this series.

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Part 3. Managing Hypoxylon Canker

Hypoxylon canker, caused by the fungus *Biscogniauxia atropunctatum*, occurs on trees exposed to stress. Therefore, the disease may be controlled by preventing the stress from occurring and allowing the tree's natural resistance mechanisms to inhibit the pathogen. If a tree succumbs to stress, then measures must be taken to reverse the condition before the pathogen can invade.

Measures should be taken to avoid those stress factors listed in Part 1 of this series. If any of these or other stress factors occur, then remedial action should be taken to maximize the regeneration of the root system and allow the tree to cope with the subsequent strain. An aggressive way to improve the soil environment and stimulate feeder roots is through vertical mulching.

Vertical mulching→ In addition to fertilizing and root zone aeration, vertical mulching can increase gaseous exchange in the root system. Vertical mulching can also lessen damage due to excessive water, provide necessary aeration during wet periods, allow water penetration during drought periods, and promote the formation of fine feeder roots. Vertical mulching is a process by which a porous matter, such as pea gravel, sand or a mixture of compost with pea gravel, rice hulls or sand is added to holes drilled throughout the root

zone of the tree (Figure 1). The holes should be 18 – 24" deep and a few inches in diameter.

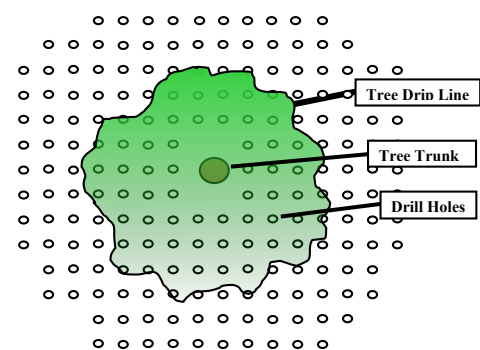


Fig. 1. Vertical mulching diagram illustrating placement of holes.

Remedial pruning→ If 15% or less of the canopy is affected, prune out all dead branches. All pruning should be done utilizing proper pruning practices.

Tree removal→ If over 15% of the canopy is infected, one should consider cutting the tree down. This pathogen causes a white rot of the wood and trees killed by *B. atropunctatum* may quickly become a hazard. Since the fungus is already present throughout a stand, destroying the wood to prevent further infections is questionable. Nonetheless, storing diseased wood in the immediate vicinity of remaining trees should be avoided.

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