

Root and Butt Rot of Oaks

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Within the past decade there has been an increase in root and butt rot of old oak trees in North Carolina, especially in urban landscapes, parks and along streets. Although several species of oak have been involved, willow oak and water oak are the most frequently affected. These two oak species were commonly planted along streets and in the landscape in the early to mid 1900s, and normally live 65-80 years. These trees are succumbing to a variety of problems as they reach their life-expectancy.

Cause

Several species of wood decay fungi cause root and butt rot of oaks. In the southeastern United States, the following fungi have been reported on different oak species: *Armillaria* spp., *Bondazewia berkeleyi* (*Polyporus berkeleyi*), *Ganoderma lucidum* (*curtisii*), *Grifola frondosa* (*Polyporus frondosa*), *Inonotus dryadeus* (*Polyporus dryadeus*), *I. dryophilis*, *Laetiporus sulphureus* (*Polyporus sulphureus*), and *Meripilus sumstinei* (*Polyporus giganteus*). *Inonotus dryadeus* is one of the most common of these wood decay species.

Hosts

Most oak species are susceptible to root and butt rot by the various species of fungi listed above. The following oak species have been reported as hosts for the most commonly encountered fungus, *Inonotus dryadeus*: *Quercus alba* (white), *Q. coccinea* (scarlet), *Q. nigra* (water), *Q. phellos* (willow), *Q. prinus* (chestnut), *Q. rubra* (red), *Q. shumardii* (Shumard), *Q. stellata* (post), and *Q. velutina* (black). Older long-lived oak species (white and red oaks) and short-lived species (willow and water oaks) are most frequently affected.

Symptoms

Blow-down during rainstorms or windy periods is often the first and only indication of root rot. Sparse foliage with limb dieback also may be symptomatic of root rot but are not consistently associated with the disease prior to blow-down. Advanced decay of the larger roots, especially the tap or anchor roots, is evident after blow-down. Decay may extend from a few inches to several feet into the butt portion of the tree, depending on the species of fungus involved. Decay may be of the white rot type, characterized by whitish to straw-colored, wet, stringy wood; or of the brown rot type, characterized by brown, dry, crumbly wood often with horizontal and vertical fissures. See [Table 1](#) for the types of rots produced by the various fungi associated with root and butt rot of oaks.

Signs

One of the most important indicators of the presence of root rot prior to blow-down is the presence of basidiocarps (reproductive bodies) of the fungi. These may be of two general types. One type, usually referred to as conks, or shelf or bracket fungi, is more or less woody in texture, shelf-like, with or without a stem, and with tiny pores on the underside. The basidiocarps of the second type are mushrooms, with stems and caps with gills on the underside. The basidiocarps are usually formed at or near the base of the tree, but also may be formed 3 to 6 feet or more from the base, coming from decaying roots. General descriptions of the more common species of fungi associated with root and butt rot of oaks are given in [Table 1](#).

Studies have indicated that severity of decay can be estimated by: 1. Presence of basidiocarps; 2. Number of basidiocarps-the greater the number, the more decay; 3. Size of basidiocarps-the larger the basidiocarp of a given species, the more decay; and 4. Distribution of basidiocarps around the tree-the larger the percentage of the circumference found, the more decay.


In addition to the presence of basidiocarps, root rot caused by *Armillaria* spp. can be identified by the presence of white, fan-shaped mats of fungal tissue (mycelium) beneath the bark at the base of the tree or on larger roots, and by black, shoestring-like structures (rhizomorphs) that can be found beneath and on the surface of the bark and in the soil.

Control


Prevention is difficult due to the longevity of the oaks and the locations where the disease is frequently found. The fungus enters the tree through wounds so any precaution that would reduce injuries to the roots or base of the tree is advisable. However, prevention of injuries over several decades in landscape situations is difficult or even impossible.

Prompt action upon diagnosis of the disease is paramount. Since positive diagnosis is dependent on presence of the basidiocarps, decay is usually well advanced at this time. Removal of the affected tree to avoid damage to surrounding property is recommended as soon as possible. Blown-down trees can cause considerable damage to property.

Table 1. Description of basidiocarps and type of decay produced by the more common species of fungi causing root and butt rot of oaks.

Fungus	Type of rot	Description	
<i>Armillaria</i> spp.	White, yellow brown, stringy	Brown mushroom, in clusters, with a ring on stem	

<p><i>Bondarzewia berkeleyi</i></p>	<p>White, stringy</p>	<p>Large, multibranched, cream top</p>	
<p><i>Ganoderma lucidum</i></p>	<p>White</p>	<p>Orange-maroon, "varnished" top, hard, with or without stem</p>	
<p><i>Grifola frondosa</i></p>	<p>White</p>	<p>Large, multibranched, gray top, fibrous</p>	
<p><i>Inonotus dryadeus</i></p>	<p>White</p>	<p>Very large, cream top becoming brown</p>	

<p><i>Inonotus dryophilus</i></p>	<p>White</p>	<p>Brown to reddish brown, 3-6 feet up the trunk</p>	
<p><i>Laetiporus sulphureus</i></p>	<p>Brown cubical</p>	<p>Large, bright yellow to yellow orange</p>	
<p><i>Meripilus sumstinei</i></p>	<p>White</p>	<p>Large, multibranching, gray to brown top</p>	

Recommendations of specific chemicals are based upon information on the manufacturer's label and performance in a limited number of trials. Because environmental conditions and methods of application by growers may vary widely, performance of the chemical will not always conform to the safety and pest control standards indicated by experimental data. All recommendations for pesticide use were legal at the time of publication, but the status of registration and use patterns are subject to change by actions of state and federal regulatory agencies. Last printed 04/91

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