

Tree Diseases that Create Hazards

<http://extension.psu.edu/plant-disease-factsheets/all-fact-sheets/hazard-trees>

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Most plant diseases cause a loss of yield or damage the aesthetic qualities of the infected plant. Certain diseases of trees, however, weaken their structure and create a hazardous situation where property damage or serious bodily injury could result from falling limbs or the toppling of the entire tree. It is imperative that arborists, landscapers, and grounds maintenance personnel recognize the signs that a particular tree may present a real hazard.

Fungi, in most cases, are involved in tree diseases that result in the tree becoming a hazard. The activity of these fungi often follows this pattern:

1. A wound occurs through pruning, wind damage, lawn mower injury, excavation for buildings, curbs, or sidewalks, and trenching for water and gas lines, as well as other activities of man.
2. The fungus enters the wound and causes a discoloration of the wood. Or, a fungus begins to rot roots directly with no wound required for entry.
3. Enzymes produced by the fungus decay the wood to release nutrients for the fungus, greatly weakening the wood fibers.
4. Wood of the internal portions of the trunk or limbs loses strength. Or, the root structure is so weakened that physical support is greatly reduced. Limbs die giving the crown of the tree an asymmetrical shape. Small twigs and branches may litter the ground under the tree.
5. The fungus begins to reproduce by forming a mushroom, conk, or shelf-like structure (fruiting structure in which spores are formed) directly on the limbs, trunk, butt, root flares or on roots at some distance from the base of the tree.
6. Larger limbs die and may fall. In the case of root rot, the entire tree may topple in a wind storm.

Symptoms And Management

A tree with slowed growth, branch dieback, smaller than normal leaves or needles, excessive cone or seed set, premature autumn leaf coloration, or severe winter twig kill may be exhibiting early symptoms of a disease in which one of the fungi noted below is involved. Nothing can be done for the tree once it is infected. Nor is it likely that the fungus can be completely eliminated from the soil or general area around the tree once the tree is removed.

A tree with fungal fruiting structures on several limbs, the trunk, butt, or roots should be removed promptly if it is in a location where property damage may occur or people or pets could be struck by falling limbs or the falling tree. If most of the tree appears healthy, any single branches with fungal fruiting structures should be removed promptly, regardless of the identity of the fungus present.

The Fungi Often Involved*

Armillaria – Fungi belonging to this genus cause Armillaria root rot or shoestring root rot on a wide variety of conifers and hardwoods. The fruiting structure is a fleshy, firm, honey-colored mushroom that forms annually in the autumn in groups of a few up to 100 or more in a cluster. The cap of the mushroom is 1.5 to 6 inches in diameter with a slightly depressed center and may have brown, scale-like spots. Although the cap is usually dry, it may be slimy after a rain. Its stem is 0.5 to 1 inch thick and may be 2 to 6 inches long. The spores are formed on flat, plate-like structures (gills) that radiate from the stem toward the margin of the cap. A white fan of fungal growth is often found just under the bark at the base of the infected tree. Dark brown rhizomorphs (very coarse shoestring-like threads) may be found under the bark or on the surface of the roots or trunk of hardwoods but rarely on conifers. Those hardwoods and conifers most susceptible are ones under stress from multiple years of defoliation by insects (gypsy moth larvae, leaf rollers, and others), drought, mechanical injury, or improper planting (J-rooting of conifers, etc.). Recently transplanted material is very susceptible. The mushroom is edible but only an expert sure of the identification should attempt to collect and consume it.





Armillaria fruiting structures.



Rhizomorphs pulled from base of a tree.

Fomes fomentarius – The fruiting structure of this fungus is hard, gray on top, hoof-shaped, and 6 to 8 inches across. This structure enlarges perennially. The underside of the "hoof" is white with millions of tiny pores in which the spores are formed. While cherry, hickory, apple, maple, and others are susceptible, beech, and birch are most frequently found infected.

Ganoderma lucidum – This fungus causes a root rot and forms a very distinctive shelf-like structure on the wood. Fruiting structures formed annually occur singly or in overlapping clusters, are brown to reddish brown on top with a cream to white-colored margin, and may

become 14 inches across. The upper surface may appear to have been varnished. Apple, ash, European beech, birch, cherry, elm, sweetgum, hickory, locust, maple, oak, redbud, sassafras, willow and others are susceptible.

Ganoderma applanatum (formerly *Fomes applanatus*) – The butt rot caused by this fungus on apple, basswood, beech, birch, cherry, elm, sweetgum, horsechestnut, locust, maple, oak, poplar, spruce, hemlock, sycamore, and willow may take several years to kill the tree but makes the tree very susceptible to windthrow. A very distinctive shelf-like fruiting structure forms singly on the wood at or near the soil line. It is brown to reddish brown on top with a cream to white-colored margin. The brown portion looks dry and does not appear to have been varnished. The shelf grows perennially for 5 to 10 years and may reach 8 to 12 inches across. The underside of the shelf is light colored with millions of tiny pores in which the spores are formed. The underside turns brown where scratched and forms an interesting drawing surface, thus the common name, "Artist's Conk". Infected trees slow in growth rate, have branches dying, and their leaves are small and yellowed. Although it may require several years for the tree to die, an infected tree poses a hazard.



New fruiting structures.

Inonotus dryadeus (formerly *Polyporus dryadeus*) – This fungus can cause a root and butt rot particularly on oaks. Trees may topple before any obvious symptoms are noted. Infected trees often have a branch dieback, and fewer than normal leaves that are yellowed. Although the

root rot begins well out on the root system, the fungus eventually reaches the butt of the tree where it forms large, tough, irregularly shaped light brown to dark brown shelves at or just above the soil line. With age, these become very rough and dark brown to black. Cutting the shelf reveals a reddish-brown center. The underside of the shelf is brown with millions of tiny pores in which the spores are formed. A sure sign of severe damage to the tree is the presence of the fruiting structures. Infected trees should be removed immediately.



Old fruiting structures.

Laetiporus sulfureus (formerly *Polyporus sulfureus*) – This fungus forms massive clusters of bright, sulfur-yellow to salmon to bright orange shelf-like fruiting structures that turn white with age. These initially form in the summer or autumn on the wood of the tree but fall off during the winter. The underside of the fruiting structure has millions of tiny pores in which the spores are formed. New ones form on the wood the following summer and autumn. The margin of young fruiting structures are edible but should be collected and consumed only by experts sure of their identification. The bark where the fruiting structure forms is slightly depressed and cracked. Fruiting occurs long after most of the damage has been done. Infected trees are very prone to wind breakage even before the fungus begins to form fruiting structures and should be removed at the first sign of infection. Ash, beech, cherry, butternut and walnut, elm, pine, spruce, maple, oak, and locust among others are susceptible.



*Many other fungi can be found on dead and dying trees. Note that the formation of the fungal fruiting structure, regardless of the identity of the fungus, is the last step in a process that results in a structural weakening of the tree.

References

Blanchard, R. O., and T. A. Tattar. 1981. Field and laboratory guide to tree pathology. Academic Press, NY. 285 pp.

Boyce, J. S. 1961. Forest pathology. Third ed. McGraw-Hill, NY. 572 pp.

How to detect, assess and correct hazard trees in recreational areas. 1993. Minnesota Dept. of Natural Resources-Forestry. St. Paul, MN 55155

Matheny, N. P., and Clark, J. R. 1994. A photographic guide to the evaluation of hazard trees in urban areas. International Society of Arboriculture, Savoy, IL. 85 pp.

Miller, O. K. 1977. Mushrooms of North America. E. P. Dutton Division, Sequoia-Elsevier Publishing Co., Inc., NY. 368 pp.

Sinclair, W. A., H. H. Lyon, and W. T. Johnson. 1987. Diseases of trees and shrubs. Cornell University Press, Ithaca, NY. 574 pp.

Electronic Reference: <http://willow.ncfes.umn.edu/fth_pub.htm> This is the forest and tree health publications World Wide Web location with access to How to Recognize Hazardous Defects in Trees.

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