

# White Mottled Rot

## Root rot that topples live aspen

**Pathogen**—White mottled rot is caused by the fungus *Ganoderma applanatum*. The fruiting body of the fungus is known commonly as “artist’s conk” for reasons explained below.

**Hosts**—Although *G. applanatum* occurs on many tree species (often on dead trees) across the northern hemisphere, it occurs primarily on living aspen in the Rocky Mountains. It can persist for some time after the tree dies and may also occur on cottonwoods.

**Signs and Symptoms**—The fruiting body is a conk (shelf fungus) that occurs at the base of infected aspens, usually within about 12 inches (30 cm) of the soil line (figs. 1-2). It is initially a white bulge, and the margin remains white when actively growing. It becomes more or less flat and may grow up to about 12 inches (30 cm) wide and project out the same distance. The upper surface is irregular-shaped and brown to gray; the lower surface is pure white when fresh with fine pores. Although not every infected tree has conks, most advanced infections produce conks before the tree falls over or dies. Conks are the only useful indicator of infection in live, standing trees.

Where the fresh white underside of a conk is bruised, as with a finger or stick, it immediately and permanently becomes dark brown. Artists may use this reaction to draw pictures, leading to the common name of the fungus, “artist’s conk” (fig. 3). If the conk is then left to dry, the contrast remains and the surface is no longer sensitive.

The fungus causes extensive decay of the roots and butt of the tree (fig. 4). Decayed wood is mottled with alternating, small, white and light tan areas. The wood eventually becomes spongy, and black zone lines may develop in it.

**Disease Cycle**—Infection may occur from airborne spores or, in some cases, from contacts with infected roots of neighboring trees. Little is known about how or where spores cause infection, but it may occur at small wounds in the roots or root collar. Root-to-root spread, leading to disease centers or groups of infected trees, seems to occur primarily on the best aspen sites with deep soil.



Figure 1. Conk of the pathogen *Ganoderma applanatum*. The margin is white and blunt and the underside is white when actively growing. Photo: Jim Worrall, USDA Forest Service.



Figure 2. Another conk of the pathogen *Ganoderma applanatum*. The margin is white and blunt and the underside is white when actively growing. Photo: Mary Lou Fairweather, USDA Forest Service.

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Figure 3. Artwork drawn using only a stylus and the fresh, sensitive pore surface that turns dark brown where bruised. Photo: Jim Worrall, USDA Forest Service



Figure 4. Typical failure of live aspen due to white mottled root rot. Roots usually break near the root collar and no significant root plate or ball is lifted from the soil. Photo: Jim Worrall, USDA Forest Service.

After the tree is infected for several years, the pathogen has gathered sufficient resources to reproduce. Conks are produced near the base of the tree. Microscopic, airborne spores are released from the pores on the underside of conks.

Conks can produce huge numbers of spores. In only 4 by 4 inches (10 by 10 cm) of conk surface, it has been estimated that 4.65 billion spores can be produced and released into the air in a 24-hour period.

**Impact**—White mottled rot is by far the most important root disease of aspen in the West. Infected trees usually fall over while alive, often with healthy-looking crowns. The disease is typically associated with about 90% of windthrow of live aspen trees. It can be particularly important in developed sites as it contributes to hazard trees. Small trees or trees on poor sites with dry, shallow soils may be killed before decay leads to windthrow.

The disease seems to be most common and damaging on moist sites with good aspen growth. It is not known if this is because of favorable physiology of vigorous trees or favorable soil characteristics of good aspen sites. In particular, root-to-root spread, leading to disease centers, occurs primarily on good aspen sites.

**Management**—Practical methods for preventing or reducing the incidence of white mottled root rot are not available. In developed sites with aspen, hazard tree inspectors should be trained to recognize conks. In the long run, Regional policy strongly encourages shifting vegetation away from aspen in developed sites.

Because the disease kills and decays roots, there is concern that it may affect the success of suckering after cutting infested stands. However, studies are needed to determine whether this occurs and how large the effect is.

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1. Hinds, T.E. 1985. Diseases. In: DeByle, N.V.; Winokur, R.P., eds. Aspen: ecology and management in the western United States. Gen. Tech. Rep. RM-119. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 283 p.

2. Ross, W.D. 1976. Fungi associated with root diseases of aspen in Wyoming. Canadian Journal of Botany 54:734-744.