

Cytospora Canker of Aspen

Orange weeping bark

Pathogen—Cytospora canker of aspen is most commonly caused by *Valsa sordida*, a name that applies to the sexual fruiting stage as well as the whole fungus. However, the fungus is frequently called *Cytospora chrysosperma*, because this name applies to the asexual, or conidial, fruiting stage, which is most commonly seen. Other, related species of Cytospora-like fungi, such as *Leucostoma niveum* (asexual stage *Leucocytospora nivea*) can occur on dying and dead bark and may cause cankers in some cases.

Hosts—*Valsa sordida* primarily causes disease on *Populus* species. Related fungi occur on many other hosts.

Signs and Symptoms—The small, pimple-like fruitbodies are embedded and break through the bark surface. They may be so numerous and small that they roughen the bark surface like coarse sandpaper. The exposed surface of the asexual fruiting body (the disk) is gray to black and prominent or reduced in *Valsa sordida* and is usually white but sometimes gray-brown in *Leucostoma niveum*. During wet weather when temperatures are above freezing, conidia may be produced from the fruitbodies in a sticky matrix. If the bark is moist but not wet, fine, curly, orangish tendrils of spores project from the fruiting bodies, extruded like toothpaste from a tube. Otherwise, amber- to orange-colored spore masses may adhere to the bark surface (fig. 1). Sexual fruitbodies are superficially similar to those that produce conidia.



Figure 1. Pycnidia of *Cytospora* sp. with orange spore masses. Photo: Jim Worrall, USDA Forest Service.

The most common symptom is rapidly spreading necrosis (death) of bark. On smooth bark, this appears first as an orange discoloration that may be accompanied by exudation of a brown liquid (fig. 2). The inner bark turns from green to brown to black, and bark begins to slough off after 2-3 years. Cankers may be diffuse, continuing their spread until the tree is dead without stopping or becoming sunken. Once any point on the stem or branch is girdled (killed all the way around), everything above that point dies. On trees of intermediate susceptibility, cankers may be annual, stopping growth after one season and becoming sunken and callused over as the tree grows around them. In rare cases, the canker can resume growth in successive dormant seasons, approximating the appearance of a perennial target canker.

Disease Cycle—*Cytospora* species are usually opportunistic pathogens. They are quick to attack plants that are stressed by heat, drought, winter injury, and other diseases and insects. They often attack and kill stressed trees that may otherwise have survived the stress and recovered. They also colonize dying or recently dead tissues as saprobes. *Valsa sordida*, the primary cause of Cytospora canker of aspen, is one of the more aggressive species in the group.

Most canker pathogens, including *Cytospora* species, have traditionally been thought to infect primarily through wounds. More recent information suggests that they can sometimes infect and inhabit apparently healthy bark and buds, thus being in a position to rapidly colonize and kill weakened tissues. Such infection by a pathogen without symptom production is termed a latent infection. In addition to wounds, infection may occur through buds, nodes, and lenticels.



Figure 2. Cytospora canker of aspen. Bleeding is usually not this copious and may be absent. Photo: Rocky Mountain Region Archive, USDA Forest Service.

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Once the pathogen has infected and is causing disease, it kills the cambium and living tissues in the bark. As a result, the underlying wood dies. Cankers typically develop when the host is dormant, but can develop during the growing season when the host is severely weakened. Cankers develop in a temperature range of 36-86 °F and may grow as fast as 1.6 inches (4 cm) per day.

Microscopic conidia are produced by the millions in the asexual fruitbodies. Conidia are dispersed by rainsplash and incidentally by insects or other animals. Later, ascospores may be produced. Ascospores may be extruded and dispersed like conidia, but under some conditions, they are forcibly ejected into the air when mature and are dispersed by wind.

Impact—Mortality is the major impact of Cytospora canker. Although stress usually precedes severe infection, disease impact can be substantial because trees may recover from stress in the absence of the canker.

The canker also impacts regenerating stands. A study of mortality greater than 90% in 4- to 5-year-old stands in 1988 found rapidly expanding cankers with consistent *C. chrysosperma* fruiting. Symptoms were reproduced in greenhouse inoculations, but it was not known what conditions led to such severe disease in these cases.

Management—Avoiding wounds and stress will reduce the likelihood of Cytospora canker in individual trees. Clearcutting, prescribed fire, or wildfire will stimulate regeneration and will give the best chances for maintaining aspen on the site.

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