

Melampsora Rusts

Common leaf rusts of poplars and willows

Pathogen—Several *Melampsora* species occur in the Rocky Mountain Region, but the most common and important is *M. medusae* (= *M. albertensis*), the fungus that causes conifer-aspen leaf rust. Less common species include *M. occidentalis*, which causes conifer-cottonwood rust, and *M. epitea*, which causes willow rust.

Hosts—Aspen, cottonwood, and willow are hardwood (telial) hosts. Aecial hosts include Douglas-fir, lodgepole pine, ponderosa pines, true firs, *Saxifraga* species, and *Ribes* species. Host relationships are described in table 1.

Signs and Symptoms—Melampsora rusts are the common leaf rusts of poplar and willow. The most obvious indicators are the yellow leaf spots, which eventually become necrotic, and the orange powdery pustules on the underside of poplar and willow leaves. On conifers, infected needles shrivel and die soon after sporulation, but yellow aecia are sometimes visible on cones.

Disease Cycle—The life cycles of *Melampsora* species are complex and generally require two unrelated host plants and five different spore stages. Teliospores overwinter on dead poplar or willow leaves on the ground. In the spring, teliospores germinate, producing wind-disseminated basidiospores that infect current year's conifer needles and cones. Spermogonia (pycnia) and aecia (yellow pustules) develop within several weeks on the underside of needles. Orange-yellow aeciospores are dispersed in the wind to infect hardwood hosts. Conifer needles become necrotic, shrivel, and are shed shortly after sporulation. Infected poplar and willow leaves produce urediniospores that infect other leaves of the same species throughout the summer, intensifying the disease (figs. 1-3). In the fall, brown, crust-like telia form in place of uredinia. Mild temperatures (65-70 °F) and moist conditions (continuous moisture on leaf surface for 2-24 hours) are required for infection.

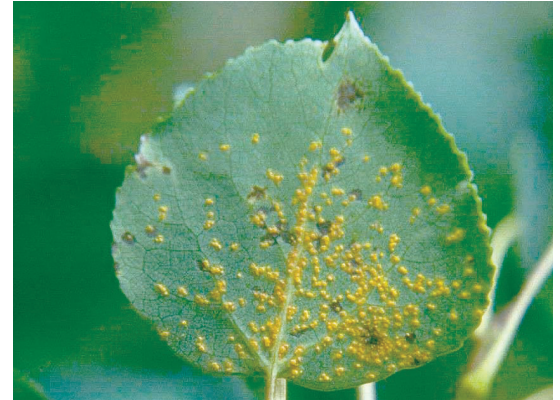


Figure 1. Orange, powdery pustules (uredinia) on the underside of an aspen leaf. Photo: Mike Schomaker, Colorado State Forest Service, Bugwood.org.

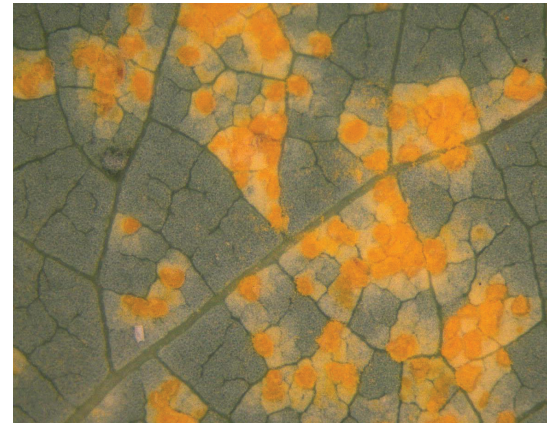


Figure 2. Close-up of uredinial pustules on the underside of an aspen leaf. Photo: William Jacobi, Colorado State University, Bugwood.org.

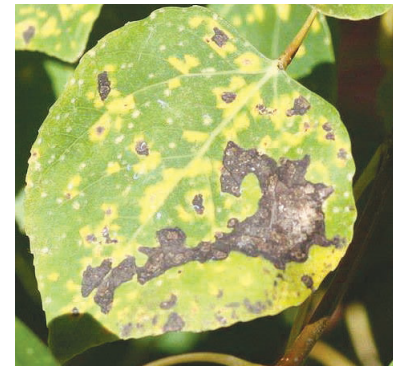


Figure 3. Yellow and necrotic spots on the upper surface of infected aspen leaves. Photo: Whitney Cranshaw, Colorado State University, Bugwood.org.

Table 1. Hosts and alternate hosts for Melampsora rusts that occur in the Rocky Mountain Region.

Fungus	Common name	Host (aecial)	Alternate host (telial)
<i>Melampsora medusae</i>	Conifer-aspen rust	Douglas-fir, lodgepole, and ponderosa pine	Aspen (most common) and cottonwood
<i>M. occidentalis</i>	Conifer-cottonwood rust	Douglas-fir and possibly lodgepole and ponderosa pines	Cottonwood and other Poplars
<i>M. epitea</i>	Fir-willow rust and <i>Ribes</i> -willow rust	True firs and <i>Ribes</i> spp.	Willow

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Impact—Impacts are more severe on hardwoods than on conifers. The disease causes discoloration, shriveling, and premature dropping of poplar and willow leaves. Severe defoliation may reduce growth and increase susceptibility to other diseases or insects. Impacts to conifer hosts are minimal.

Management—Plant resistant or tolerant clones, where available. Removing and destroying diseased leaves from the ground may help reduce infections. Wide spacing between trees may create a less favorable microclimate for spread and infection. Chemical controls are usually not warranted.

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1. Riffle, J.W.; Peterson, G.W., tech. coords. 1986. Diseases of trees in the Great Plains. Gen. Tech. Rep. RM-129. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 149 p.
 2. Sinclair, W.A.; Lyon, H.H.; Johnson, W.T. 1987. Diseases of trees and shrubs. Ithaca, NY: Cornell University Press. 574 p.
 3. Ziller, W.G. 1974. The tree rusts of western Canada. Publication No. 1329. Victoria, BC: Canadian Forestry Service, Environment Canada. 272 p.

