

# Western Gall Rust

## Pine-to-pine rust of branches and stems

**Pathogen**—Western gall rust is caused by the fungus *Peridermium (Endo-cronartium) harknessii*.

**Hosts**—Western gall rust is a pine-to-pine rust with no alternate host. Most two and three-needle pines in the West are susceptible, but the disease is especially common on lodgepole and ponderosa pine.

**Signs and Symptoms**—The disease causes round to pear-shaped woody swellings (galls) on branches or stems (fig. 1). Galls and cankers are most obvious in the spring and early summer when sporulation occurs. Flared target cankers, called “hip” cankers, are very common on larger lodgepole pine stems in the Rocky Mountain Region (fig. 2).

**Disease Cycle**—*Peridermium harknessii* does not require an alternate host to complete its life cycle but spreads directly from pine to pine. White to orange pustules (aecia) full of yellow-orange spores (aeciospores) form in bark cracks on galls or, less commonly, at the edges of stem (hip) cankers in spring. Aecia rupture during moist weather and release spores that disperse in the wind. Most infections occur on the current year’s shoots or needles, which are highly susceptible until they reach 90% elongation. Infection rarely occurs through wounds on older shoots. Trunk infection occurs through smaller side branches or from branch galls near the main stem (figs. 3-4). Galls are produced at the point of infection and sporulation typically occurs the second or third year. Host cambial cells are stimulated by the pathogen to divide rapidly, causing spherical gall formation.

**Impact**—Western gall rust affects trees of all ages, causing growth loss, branch death, and deformity. Mortality is most common in seedlings and saplings because galls can quickly girdle the small stem. Branch galls typically only live a few years until the branch and the gall die. Mortality may result when numerous branch galls occur throughout the crown.

Hip cankers can severely deform larger trees, and wind snapping is common. They may persist for many years (100-200 years), but mortality is rare because they usually expand faster in a vertical direction. Stem cankers have very little impact on growth but can greatly reduce merchantable volume.

Mass infection tends to occur in wave years when conditions are particularly favorable. In the Rocky Mountain Region, wave years are somewhat rare, occurring approximately every 5-15 years. Vigorous trees are more prone to infection during this time because they have a larger proportion of susceptible foliage.

**Management**—Management of western gall rust is complicated because of the lag time between infection and symptom development. The following options may be useful for reducing disease impacts, but complete sanitation is difficult.



Figure 1. Branch gall sporulating on lodgepole pine. Photo: James T. Blodgett, USDA Forest Service, Bugwood.org.

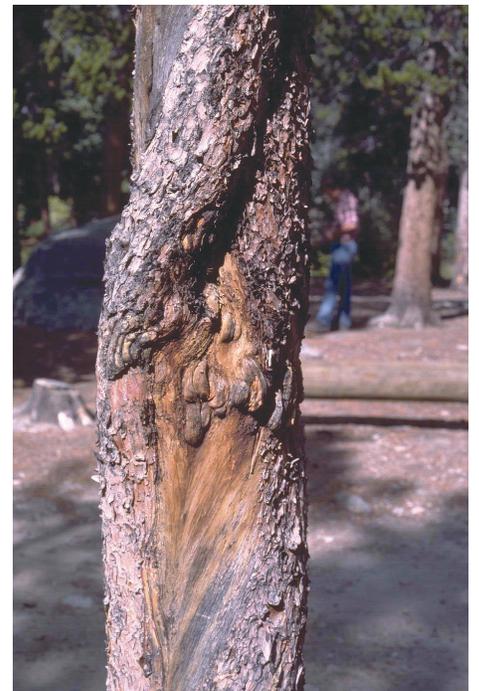


Figure 2. Hip canker on lodgepole pine. Photo: William Jacobi, Colorado State University, Bugwood.org.

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Figure 3. Stem canker that was initiated by a branch gall severely deforms the stem at the point of the canker. Photo: James T. Blodgett, USDA Forest Service.



Figure 4. Stem gall on ponderosa pine. Photo: James T. Blodgett, USDA Forest Service.

- *Sanitation.* This option involves removing all trees with stem infections and carefully selecting leave trees that are disease-free or only have branch galls or stem cankers high in the crown. Trees with stem cankers can be hazardous in recreation areas and should be given priority for removal.
- *Pruning.* Pruning infected branches provides little benefit to the tree because branches with galls usually die anyway. However, pruning may reduce inoculum levels in some areas.
- *Prepare for disease losses.* Regenerate stands at increased stocking levels to compensate for future rust-caused mortality.
- *Manage species.* Plant non-host species that are adapted to the site.
- *Destroy and regenerate.* It may be necessary to start over in areas where infection is severe and managing species is not an option.

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