

57. Western Gall Rust of Pines

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Western gall rust is a disease that affects pines in nurseries and in plantings in the Great Plains.

Hosts and Distribution

The western gall rust fungus, *Endocronartium* (*Peridermium*) *harknessii*, infects many native hard pines, including ponderosa, lodgepole, and jack pines, as well as the exotic Scots and mugo pines. Western gall rust generally is found throughout the pine forests of western and northern North America, the northern Great Lakes region, and in scattered locations in eastern North America. The fungus occurs in natural stands and stringers of ponderosa pine in and adjacent to the western Great Plains.

Symptoms and Signs

The disease is characterized by globose to pear-shaped galls (fig. 57-1) on branches and stems of pines of all ages (fig. 57-2). These galls are most conspicuous in the spring, when the gall surface ruptures, exposing bright orange spores (fig. 57-3). Cankers sometimes form on main stems; such cankers are usually associated with branch galls adjacent to main stems. Witches'-brooms sometimes develop following infection.

Disease Cycle

Spores form in the spring in galls on pine branches and stems. They are dispersed in May and June, and infect current-year shoots. Galls form mostly in the sum-

Figure 57-1. Galls of various shape on ponderosa pine branches infected by *Endocronartium harknessii*.



Figure 57-2. Galls on Scots pine infected by *E. harknessii*.

mer following the year of infection. Galls formed in the summer produce spores the following spring. Thus the time from infection to first sporulation is usually 2 years. Spores can directly infect other pines rather than go through an alternate host. Spores continue to be formed in galls year-after-year.

Damage

Because the fungus spreads from pine to pine, even a single infected seedling can ultimately result in an epidemic of western gall rust in plantings. Stem galls (fig. 57-4) may make up to 10 percent of nursery seedlings unsalable. Galls may weaken the stems, resulting in wind breakage. Abundant galls on branches may cause tree stunting or mortality. Pines in landscape and



Figure 57-3. Gall with surface removed, exposing masses of spores.

There is considerable variation in susceptibility to this pathogen among geographic sources of ponderosa pine. Some highly resistant sources have been identified. Use of this resistance could reduce damage.

Selected References

- Peterson, Glenn W. Dispersal of aeciospores of *Peridermium harknessii* in central Nebraska. *Phytopathology*. 63: 170-172; 1973.
- Walla, J. A.; Stack, R. W. Western gall rust in North Dakota. *Plant Disease Reporter*. 63: 432-433; 1979.
- Hiratsuka, Y. *Endocronartium*, a new genus for autoecious pine stem rusts. *Canadian Journal of Botany*. 47: 1493-1495; 1969.
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Christmas tree plantings may lose value because of tree stunting, witches'-brooms, and dieback of tips.

Control

The most effective and economical control in nurseries is to remove the source of infecting spores. All gall-bearing pines within a half mile of the nursery should either be pruned free of all galls or felled. All gall-bearing seedlings should be destroyed. This sanitation measure should be done before galls sporulate in the spring.

Reducing the impact of this disease in infected plantations is difficult. Removal of gall-bearing branches probably would somewhat reduce the level of infection, but eradication of the fungus by removal of galls is not feasible, because of latent infections. A single application of maneb at the beginning of spore release has prevented infection of Scots pines in Christmas tree plantings in Pennsylvania.

Prevention is the best method for control in field plantings. If possible, obtain stock from a nursery that is free of the disease. Inspect trees for galls when planted and again the following two springs.



Figure 57-4. Galls on lodgepole pine seedlings infected with *E. harknessii*.