



# Timber Talks



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## WEATHER AFFECTS ROT INFECTION IN BALSAM FIR

No. 44

Trees become diseased from spores dispersed from a variety of fungi. Symptoms indicative of a fungal infection include the presence of conks and cankers, deterioration and coloring of cellular structures, needle casts and dying or deformed tops. A common internal defect in the true firs is caused by the red heart rot fungus. The spores of this fungus gain entrance to the tree through fresh wounds on living trees and branches. A red decay develops and spreads through the heartwood, resulting in serious loss of wood volume or reduced wood quality. Conditions conducive to the susceptibility of the species to infection, and the role of fungal and bacterial competitors to the fungus and their limiting factors was investigated.

Spore discharge was measured in balsam fir stands near Quebec City where red heart rot was prevalent, and spore germination determined in the laboratory. Infection courts were prepared on living trees and on excised stem sections, and after exposure under different conditions in the field, wood samples were brought to the laboratory where the kind and distribution of colonizing microorganisms were determined. The field and laboratory studies were conducted to ascertain if the infection process was influenced by duration of exposure, colonization of the host by other microorganisms, wood moisture content, temperature, and height of the tree wound above the surface of the ground.

Optimal conditions for spore dispersal and germination occurred in periods of high humidity, during and immediately after rain and when the daily mean temperature was 45 to 75°F. Infection of fresh wound surfaces was most pronounced when temperatures were between 45 and 55°F and mainly confined to the first week after the tree injury. Reduction in susceptibility of wounds to infection at higher temperatures and prolonged exposure resulted from the change in environment that produced conditions favorable to infection from competitive fungi. Infection most frequently occurred if it rained on the day the wound was made or during the immediate succeeding days. Susceptibility to infection, however, was not related to natural fluctuations in the moisture content of the wood; there was some evidence that frequency of infection was less at the lower part of the tree than at higher elevation.

The dependence of this pathogen upon freshly made wounds emphasizes the need for greater attention to logging and natural injuries as decay hazards in living trees. Both the role of competitive microorganisms and the influence of macro and micro environment within the forest ecosystem, suggest the possibility of effective biological and silvicultural control for this dominant decay pathogen.