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## Bacterial wetwood

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### Quick Facts

Bacterial wetwood is a common disease that affects the central core or bark of many shade and forest trees.

Slime is the exudate generated from wetwood and is toxic to growing areas of the tree.

Several insects commonly feed on this slime.

Wetwood-infected tissue does not greatly alter the wood strength of most trees.

Prevention of tree stress is the best management approach since effective control measures do not exist.

### Causal Organism

Several bacteria, including species of *Enterobacter*, *Klebsiella*, and *Pseudomonas*, often are associated with wetwood. It has not been conclusively demonstrated that these bacteria cause the disease, but they are directly involved.

### Symptoms

Symptoms of this disorder include a discoloration (yellow-brown) of the wood, generally confined to the central core of a tree. This affected wood is wetter than surrounding wood and is under high internal gas pressure. The gas pressure and high moisture content cause an oozing or bleeding of slime from woods and branch crotches.

Bacterial wetwood is a common disease that affects the central core of many shade and forest trees. In Colorado, the disease is most prevalent in elm, cottonwood, aspen and willow. The disease also affects species of ash, fir, maple, birch, hickory, beech, apple, mulberry, oak, sycamore, poplar, cherry, plum, and linden.

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This information provided by:

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1. C. Rasmussen-Dykes, former Colorado State University Cooperative Extension horticulture agent, Jefferson County; and W.R. Jacobi, Colorado State University Cooperative Extension associate professor, plant pathology and weed science. 6/94. ©Colorado State University Cooperative Extension. 1994. For more information, contact your county Cooperative Extension office.

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The ooze often is foul-smelling, slimy, and colonized by yeast organisms when exposed to air. When the slime dries it leaves a light gray to white crust on the bark.



**Wetwood slime.**



**Dried slime.**

Wetwood slime is toxic to the cambium, the tissue between the inner bark and wood that produces new cells. The slime can prevent or retard callus formation when the tree has been wounded, or destroy the cambium at the base of a pruning cut. Foliage, young shoots, and grass die if slime flux drips on them.



**Retarded callus formation.**

Wetwood also can be found just under the bark, and is characterized as dark streaks in the current season's

wood, or as a discoloration in several annual rings within the spring wood. Root tissue also can exhibit wetwood symptoms as brown streaks extending from the diseased trunk into the center core and sometimes the outer wood of roots.

Radial cracks may also occur in wetwood-affected trees (Plate 1). These cracks probably develop during winter months. If the cracks extend to the cambium they serve as avenues for slime and gas to escape. The slime also will kill the surrounding cambium.

The build-up of gas pressure is a by-product of bacterial activity and in elms consists mainly of methane and nitrogen. Recent studies show the highest gas pressure occurs in elms from May through August.

Wetwood-infected tissue slightly alters the strength properties of the wood. However, it inhibits the development of wood-rotting fungi that are unable to grow in the affected wood because of lower oxygen content. Wetwood also causes warpage and splitting problems when boards, cut from affected trees, are dried.

### **Transmission**

Slime oozing often begins after wounding or pruning. It is not known whether bacteria and other microorganisms invade wounds or already are present in the wood.

The bacteria associated with wetwood are common in soil and water and probably enter trees through root wounds. Where oozing occurs, the bacteria could be transferred to a new stem or branch wounds. Wetwood also may occur in seedlings that develop from infected seeds.

### **Control**

No effective controls exist to eliminate the wetwood disease. Preventing damages and stresses to a tree's roots and stem is the best way to avoid a serious wetwood problem. Drought conditions increase problems associated with wetwood, so it is important that the tree receives adequate water, especially during summer months.

Recently transplanted trees may ooze slime if roots are not established and cannot supply adequate water. Fertilizing wetwood infected trees is recommended if the tree shows nutrient deficiencies.

To help prevent disease spread within an infected tree, keep holes for the injection of any substance into the

tree shallow so they do not reach the inner wetwood core. If they do reach the inner wetwood core the disease can spread outward. Installing drain tubes can help release pressure in those trees where wetwood is confined to inner cores and allows slime to ooze out the tube instead of somewhere else. However, this creates another wound that allows the disease to spread outward. This practice also will introduce more oxygen into the tree's system and can possibly allow wood decay. Thus, drain tubes are not recommended.

In trees affected with wetwood just below the bark, cut away the dead bark areas to allow for better wound closure. Remove discolored bark down to the wood and margins of the healthy yellow-green cambium. If this area exceeds 30 percent to 50 percent of the trunk circumference, the tree may not close the wound or produce an aesthetically pleasing tree. If, however, the area is small, shape with clean smooth edges.

### **Associated Insects**

Several insects commonly visit the oozing slime and feed upon it. Various flies and sap beetles often are seen on the slime and larval stages of these insects may develop within the wounded area. Among the most striking insects that visit oozing slime are bumble flower beetles, a hairy species of June beetle that sometimes clusters in large numbers. None of the insects that visit slime flux wounds are known to transmit the bacteria and there is no need for control.