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Bacterial Wetwood and Slime Flux of Trees

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Bacterial wetwood, a water-soaked condition of wood, affects trunks, branches and roots of many ornamental and shade trees. It is most common in elms and poplars more than 10 years old. In poplars (which include aspen and cottonwood), the disease sometimes occurs in trees as young as 2 years old.

Wetwood is common in boxelder, fir, hemlock, maple, mulberry, oak, willow and white pine. It occurs less frequently in apple, crabapple, mountain ash, beech, birch, butternut, dogwood, horse chestnut, linden, black locust, London plane, magnolia, Russian olive, redbud, sycamore, sweet gum, tulip tree and walnut.

Wetwood usually is not a serious problem in landscape trees. However, wetwood is an important economic problem in forest trees cut for lumber because abnormally colored and excessively wet wood is devalued.

Fig. 1. Light gray to brown discoloration of bark caused by wetwood slime in a Siberian elm.

Fig. 2. Discolored bark caused by wetwood slime on the trunk of an apple tree (cv. Rome Beauty).

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Symptoms

Although wetwood normally is not serious in most trees, the disease is chronic and may contribute to a general decline in tree vigor, especially in older trees growing under adverse conditions. In elms and poplars, severely affected branches may wilt and die back, and trees may die prematurely.

In elms, wetwood-affected branches show yellowing, wilting and scorching of leaves, defoliation and brown streaks in the current season's wood. These symptoms may resemble those of Dutch elm disease or Verticillium wilt.

Affected wood is water soaked, discolored and dead, with a sour or rancid odor caused by fatty acids present in it. The sour liquid is colorless while in the wood, but as it seeps out of cracks or wounds and comes in contact with air, it turns brown. Once on the plant surface, the liquid supports the growth of many types of bacteria and fungi, giving it a slimy texture and often an unpleasant odor. The slimy liquid is called "slime flux" or "wetwood slime." The liquid is toxic to the plant. It can prevent callus formation and can kill cambium at the base of a pruning wound.

"Fluxing," or seepage of the liquid, is most active during summer, and dripping wetwood slime may kill turf beneath the affected tree. Liquid seeping out of cracks or wounds and flowing down the trunk leaves vertical, light or dark stripes on the bark. The stripes have gray to white incrustations (Fig. 1).

Cause

Diverse types of bacteria, many of which are commonly found in soils and on plant surfaces, usually are associated with the wetwood condition in different trees. Often, several bacterial species are found in a single tree. Some of the bacteria associated with wetwood are *Bacillus megaterium, Enterobacter agglomerans, E. cloacae, Klebsiella oxytoca* and *Pseudomonas fluorescens* in elms, *Methanobacter arbophilicum* and *Corynebacterium humiferum* in poplars, and *Clostridium* species in oaks. The exact mode of infection is unknown.

Wetwood often contains gases at elevated pressure (up to 60 pounds per square inch has been detected in elms) that force the liquid to seep from wounds and cracks. The gas typically contains 45 to 60 percent methane and about 1 percent hydrogen, neither of which occurs in normal wood. The near absence of oxygen in wetwood prevents decay by wood-rotting fungi.

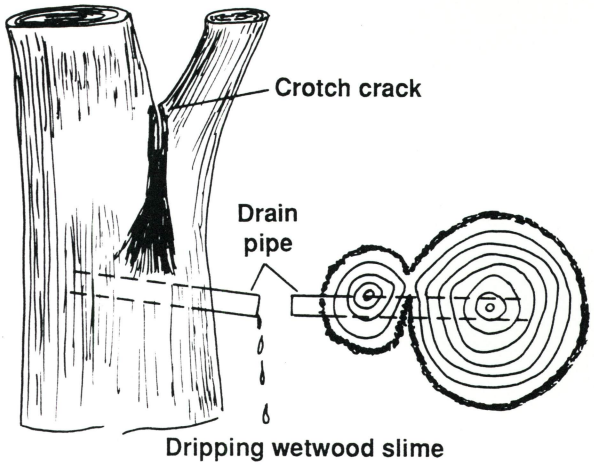

Fig. 3. A drainage tube will keep wetwood slime from blemishing the tree's bark.

Contaminated insects and pruning tools may transmit bacteria from infected wetwood to healthy tissue. Roots may become infected through wounds. Usually, the first external symptom of wetwood is seepage or bleeding from wounded tissue in branch crotches (Fig. 2), from wounds left by branch removal and from trunk cracks.

Control

No control measures are known to prevent or cure bacterial wetwood and slime flux in trees. However, slime flux can be alleviated for cosmetic purposes by inserting a metal or plastic tube that allows wetwood slime to drain directly to the ground rather than run down the trunk (Fig. 3).

Drill a ⅜- to ½-inch diameter hole, 6 to 14 inches below the fluxing region. The hole should slant upwards through the heartwood and to within a few inches of the bark on the opposite side of the trunk or branch. Insert a piece of threaded, metal or semirigid polyethylene tubing into the drainage hole, just deeply enough to hold it firmly in place. The tube should be long enough to carry the slime clear of the tree trunk and crown. This treatment also may relieve gas pressure and prevent further spread of bacteria and bacterial toxins within the tree.

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