

Wetwood and slime flux

The bacteria *Enterobacter cloacae* along with several other bacteria commonly occur in elms in association with the water-soaked condition of wood called bacterial wetwood. When the liquid exudes out of wetwood and reaches the surface of the bark, it supports the growth of other bacteria as well as yeasts and filamentous fungi. This material, often called slime flux, is malodorous and has a slick feel.



Host plants:

Wetwood and the bacteria consistently associated with it occur in nearly all elm (*Ulmus*) and poplar (*Populus*). In addition, fir (*Abies*), hemlock (*Tsuga*), maple (*Acer*), mulberry (*Morus*), oak (*Quercus*), and white pine (*Pinus strobus*) often have bacterial wetwood.

Description:

Generally, wetwood is not harmful to vigorous trees, but those weakened by adverse growing conditions can slowly decline over a period of years. A cross-section of the trunk reveals that bacterial wetwood is tan-green to brown in color, has a foul smell, and is dead. The presence of wetwood within the tree becomes apparent when a mixture of bacteria, yeasts, water, and sap called slime flux oozes to the surface of the bark.



Left: Wetwood from branch scar on oak.

Photos: (left) Edward L. Barnard, Florida Department of Agriculture and Consumer Services, www.forestryimages.org (right) C. W. Murdoch, *Diseases of Woody Ornamentals and Trees*, APS Press.



Bacterial wetwood bleeding from old pruning wound on elm.

This usually happens below old branch stubs or the crotches of branches. When the slime flux runs down the trunk the bark initially develops a dark color that usually turns light gray when it dries. When wetwood liquid moves into outer sapwood, symptoms of leaf scorch, wilt, and dieback of the affected branches occur and occasionally the entire tree dies.

Disease cycle:

Wetwood occupies the trunk, branches, and roots of affected trees. Most bacteria associated with wetwood commonly inhabit soil and water. The bacteria colonize wood via wounds to roots, branches, and stems. Insects, pruning tools, rain splash, and winds move the bacteria to wound sites. Apparently, wetwood colonization also happens to seedlings with soil bacteria that enter tender roots via cortex wounds and the thin-barked stems via wounded bark. Sound large stems and branches that are free of wounds confine the wetwood to a central water-soaked zone of wood. Most trees with bacterial wetwood maintain equilibrium for many years between decay-free wetwood in the core and vascular cambium sapwood on the outer portion of the stems that function normally. Periodically high gas pressure builds within affected trees during the summer. This

frequently opens old wounds at old branch stubs and branch crotches and forces liquid to trickle out of these sites and run down the bark.

Management strategies:

There is no preventive treatment or way to eliminate wetwood from an affected tree. Properly prune trees to promote rapid closure of pruning wounds. When removing branches from trees known to have wetwood disinfect cutting surfaces with 70% ethyl alcohol or 10 percent bleach solutions between each cut. At one time installation of drain tubes was done to direct the flow of slime flux away from the trunk. However, drilling holes into the wetwood breaks the natural compartmentalization barrier around the wetwood and opens it to the spread of wood decay fungi within the trunk. This allows decay of wood surrounding the column of wetwood. Maintain a 2-3 inch layer of composted mulch around the base of the tree to minimize wounds to root flares and trunk. Remove trees affected with wetwood that are in severe decline.

Daniel H. Gillman, Plant Pathologist

UMass Extension Landscape, Nursery & Urban Forestry Program

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