

Armillaria root rot and native oaks

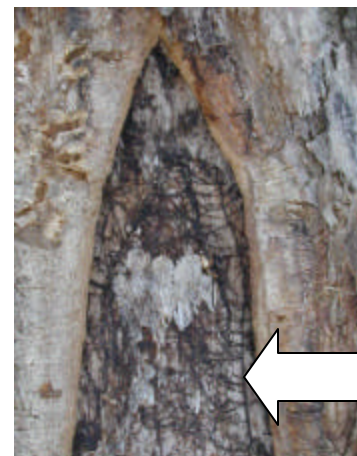
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Concern over declining oaks is impossible to soothe. Rare is the tree so long-lived and evocative in its gnarled architecture. Maybe only the squirrel, cheeks bursting with acorns, covets the tree more than we. In fact many organisms have formed partnerships of sort with oaks. The fungus *Armillaria* (also known as the oak-root fungus) has a longstanding relationship with this species as its name implies; it is thought to have evolved with the oaks. Several species of this mushroom-producing fungus assist in nature's grand scheme of recycling carbon by growing in and decaying oak wood. Unfortunately, the trees are first killed in the process.

Armillaria has been infamous for over a century as a root and butt rotter of oaks and other tree species on several continents. We now understand it to be a collection of species with varying degrees of pathogenicity (ability to cause disease in plants) and different host preferences. Sometimes, depending on the tree and fungus species involved, colonization of the roots and cambium underlying the bark occurs rapidly and healthy trees die suddenly. More often, *Armillaria* exists quietly as a symbiont not affecting tree health until it becomes stressed or the environment changes in a manner favorable to the fungus. Then the fungus "gains the upper hand" in the relationship to the demise of the tree. Tree stresses may result from numerous factors including old age; environment (e.g. droughts, lowered water table, overwatering in landscapes), and wounds. *Armillaria* disease is also exacerbated by defoliating insects, bark beetles, and other diseases. To date I have only confirmed the presence of *A. gallica* at the Arboretum, and this is a more or less secondary, i.e., stress-induced species. However, it would not be surprising if another, more virulent species, *A. mellea*, is also present as both fungi are widely distributed in eastern deciduous forests of North America.

In any case, most oak woodlands can claim one or more *Armillaria* species as long-term residents. They will not go away and failure to manage this pathogen can lead to long-term problems with not only oak, but the numerous other tree species susceptible to infection. It makes good sense to consider *Armillaria* in any natural area or landscape management plan. Target ways of minimizing stress and the spread and pathogenicity of the fungus **before** other activities, e.g. construction, plantings, burning, etc. are undertaken. Of course, recognizing the signs and symptoms of *Armillaria* root rot is the first step toward managing it. Remove sections of bark at the soil level or lower to find the white fungal mat and black/brown rhizomorphs that characterize the disease. Also be on the alert for the honey colored mushroom around bases of trees in the fall. See PHC Report 2001.08 (May 26 - June 1) for more information on recognizing *Armillaria*.

In young trees, death may occur in one season; in larger specimens, it may appear as sudden when the leaves turn brown but is likely the result of many years of root colonization. If a tree begins showing outward signs of infection, e.g. general, but persistent dieback of branches and limbs, little can be done except to remove the tree to limit further spread. Keeping trees free of stress may slow the disease if present at low levels, or prevent colonization in the first place. Excavating four to five inches of soil around the base of the tree (where the fungus takes hold) to reduce moisture merits a mention as a possible treatment, but it may be more wishful thinking as it has not been backed by data. *Armillaria* grows in dead trees utilizing the substrate as food for many years to come. For this



The arrow points to the rhizomorphs.

reason, stump removal and removal of roots & rhizomorphs can be helpful.

Oak wilt, the two-lined chestnut borer, and now Gypsy Moth are other threats to the health of native oaks. Together with *Armillaria*, these oak pests and pathogens ought to be considered collectively in a general management plan. More foresight in managing our oaks will help leave enough trees for us to admire, and acorns for us squirrels to horde.