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Barking up the Wrong Tree?
- Scientist urges expanded view of sudden oak death

By Tara Treasurefield

Three little words, "sudden oak death," are terrorizing Californians, Oregonians, and Europeans. In some locations, public officials are burning plants and trees infected with the Phytophthora ramorum fungus, to prevent the disease from spreading.

David Rizzo, a plant pathologist at the University of California at Davis, and Matteo Garbelotto, a researcher at the University of California at Berkeley, are the science advisors for the California Oak Morality Task Force (COMTF). In 2001, they identified Phytophthora ramorum as the cause of Sudden Oak Death in the central and northern coastal counties of California. Since then, COMTF's activities and events have revolved around P. ramorum, as evidenced by its March 9-10 meeting at Sonoma State University. This makes all the sense in the world to David Rizzo. "It's a matter of how you define sudden oak death," he says. "It's not sudden oak death unless it has P. ramorum." But scientists such as Lee Klinger take a broader view.

Since 1985, Dr. Klinger has conducted research on tree death and forest decline in California, Alaska, Colorado, Canada, Africa, China, and Brazil. During this time, he has held scholarly and honorary appointments at the University of Colorado, the University of Oxford, the University of East London, the Chinese Academy of Sciences, the Geological Society of London, and similar institutions.

Klinger's sterling credentials notwithstanding, in 2002, Rizzo turned down his offer to collaborate on sudden oak death research. In addition, a proposal Klinger submitted in response to a USDA-Forest Service Request for Proposals (RFP) in 2003 was denied. That year, over $1 million was awarded to thirteen grant proposals with "Phytophthora ramorum" in the title. Though he can't prove it, Klinger thinks his proposal was rejected because he has an alternative view.

Patrick Shea manages the Sudden Oak Death research program for the USDA Forest Service, Pacific Southwest Research Station. He writes Requests for Proposals relating to sudden oak death; selects reviewers for the proposals

from his anonymous list of scientists; and participates in final funding decisions with others from the USDA-Forest Service, the California Department of Forestry and Fire Protection, and the University of California. Through their websites and press releases, all three of these bodies actively promote the theory that P. ramorum causes sudden oak death.

Asserting that the USDA-Forest Service funding process is fair, Shea says, "If Dr. Klinger submits a scientifically sound proposal, it will go out for review, as do all proposals. Based on those reviews and program priorities the selection committee will make a funding decision". Shea says, "In order to ensure Dr. Klinger's (previous) proposal was given an unbiased review, I thought it appropriate to send it to scientists that are not involved in the sudden oak death research arena."

In addition to his work with the USDA-Forest Service, Shea also co-chairs the California Oak Morality Task Force Research Committee. Though COMTF as a whole has concluded that P. ramorum is the cause of sudden oak death, he maintains that the COMTF research committee has not.

Klinger has conclusions of his own. In 1985, when he was researching tree death and forest decline on Kruzof Island off the coast of Alaska, he noticed that dying trees and the ground around them were covered with moss. His 20 years of research data support his contention that moss runoff, which is highly acidic, increases the acid content of the soil and contributes to yellow cedar decline in Alaska, sudden oak death in California and Europe, and similar epidemics of dying trees and forests. The simple, non-toxic, and universal solution to tree death and forest decline, says Klinger, is to reduce soil acidity.

There are many ways to reduce soil acidity. Scientists at Hubbard Brook Research Foundation in New Hampshire, and at Cornell University in New York, are doing it by treating declining forests with calcium and other minerals. In the 1980's, German scientists reversed the decline of the Black Forest by using lime to reduce the acidic content of the soil. And long ago, Native Americans revitalized dying forests with fire, which also decreases the acidic content of the soil.

California State Ranger Patrick Robards, who has been setting prescribed fires since the early 1980s, says, "The frequency of sudden oak death in the areas that have been burned is less than in non-burned areas." Klinger explains this phenomenon. "As oak forests and other ecosystems age, the surface soils gradually become more acidic from the buildup of organic matter. Eventually,

they become acidic enough for mosses to invade and spread. Some moss cover is part of a healthy forest system, and under natural conditions, a fire is likely to burn at some point, which removes the mosses.

"However, with fire suppression, the mosses continue to grow and spread. Acid rain, by providing nutrients and acidic conditions, further encourages mosses to grow. The acids also mobilize heavy metals, which are toxic to tree roots, and deplete the soils of many mineral nutrients and kill tree roots. This can kill the tree outright, and quite often, it makes a tree more susceptible to fungi and insects."

Thus, there's good reason to believe the fungus may not be "the cause" of sudden oak death after all. "The tests used to prove that P. ramorum [is the cause of sudden oak death] are inconclusive," says Klinger. "Mosses, which are clearly implicated in soil acidification and fine root mortality, and are abundant in all areas of sudden oak death, have not been carefully investigated or controlled for in any of the COMTF research or experiments. These analyses are basic science that should be done in any forest decline situation. Until they are done, the cause of sudden oak death cannot be determined."

Rizzo acknowledges that none of COMTF's experiments have controlled for mosses. But, he says, "We've looked at soil pH, and things like that, which is really the thrust of the whole moss hypothesis. And none of it matches with what would be predicted with the moss aspect. We've taken hundreds of samples and made lots of observations. When you look at patterns of [SOD] mortality, it's not consistent with root mortality." However, says Klinger, "COMTF's data and observations relating to moss haven't been published, and thus haven't undergone the kind of critical review necessary to make any definitive scientific claims." Klinger's work on mosses has been reviewed and published in several scientific papers.

Millions of dollars of public funds are being spent on research related to the P. ramorum fungus, the assumed cause of sudden oak death. What if that assumption is wrong? In the interests of sound science, shouldn't university researchers open their minds to alternative views, and shouldn't our public servants make funding available to reputable scientists who can see beyond the P. ramorum fungus? Don't they owe it to our trees and forests?

Tara Treasurefield is an investigative reporter living in Sonoma County.