COMMON QUESTIONS ABOUT OAK TREE HEALTH IN THE NORTH COAST

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1. Are trees that are already stressed for other reasons more susceptible to diseases?

This is generally true. Trees that are stressed for whatever reason—such as scarcity of water, scorching by fire, or competition with other trees for light or food—are more susceptible to a variety of tree diseases than are non-stressed trees. Stressed trees also attract insect pests.

However, many non-native, invasive pathogens and pests—such as *Phytophthora ramorum*, the pathogen that causes the disease called Sudden Oak Death—aggressively attack both stressed and unstressed trees. Plants and animals alike are much more vulnerable to non-native pathogens than to native ones because they have not co-evolved with the pathogens for thousands of years and therefore have not had time to develop strong defenses against them. Tanoak is particularly vulnerable to *P. ramorum* because it often grows in the same moist areas that the pathogen likes and in association with California bay laurel (also known as pepperwood), one of the primary host trees known to transmit the pathogen. Ironically, bay laurel is not significantly harmed by *P. ramorum*.

2. I've heard that Native Americans maintained certain traditional practices that enhanced the health of important trees or even of entire forests. Is this true, and if so, what are these practices?

It's true that in many parts of the American West, Native American tribes utilized a variety of techniques to maintain landscapes in particular desired conditions and to provide wood and food resources.

Most notably, Native Americans regularly burned the forests and grasslands in which they lived. They did this for many reasons, such as maintaining the open condition of prairies by killing trees which encroached on the edges of those prairies; clearing forest stands of underbrush for easier travel; driving wild game; and cultivating plants that were important for medicine, food, basketweaving, and other traditional uses. Periodic, low-intensity fires kept many forest stands and large trees healthy by eliminating competition from small trees and brush and by returning nutrients from burned material to the soil. In addition, these low-intensity fires, by clearing out flammable material bit by bit, lessened the chances that catastrophic, high-intensity fires would disturb forests.

Frequent, low-intensity fires are important for many aspects of the health of most California forests. Unfortunately, public policy considerations such as air quality and fire danger to residences near forests have in recent years largely precluded the use of fire as a tool for managing California's landscapes.

We have also heard claims that Native Americans "fertilized" trees by applying seashells to the soils around them; although we have interviewed elders and cultural experts from tribes in our area of northwest California, we have been unable to verify these claims.

What can I do to ensure my oak trees' health?

Obviously, actively promoting tree health provides the best defense against pathogens and insect pests of all sorts. You can do many things to promote general tree health. The following suggestions are specific to California's native oaks; other tree species may require other maintenance measures.

- Do not irrigate mature oaks frequently. Oaks have adapted to California's dry climate.
- Avoid disturbing oak roots: do not pave the ground or compact the soil near trees.
- Avoid pruning if possible. If pruning is necessary, prune only dead, dying, or unsafe branches. Prune in the summer months when insects and fungi are inactive.
- Fertilize oaks only if the tree exhibits standard signs of nutrient deficiency such as yellowing leaves and only if a laboratory confirms that the tree is indeed nutrient-deficient.
- Avoid injury to the tree stem by pets, vehicles, or equipment.
- Know where *Phytophthora ramorum,* the cause of Sudden Oak Death, is established in the environment. Thoroughly clean vehicles, equipment, and shoes before traveling from an infested area into an uninfested area.

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3. I have heard that soils in the north coast are unusually acidic and that this is deleterious to tree growth. Is this true?

According to the Natural Resources Conservation Service (NRCS) Soil Survey for Humboldt and Mendocino Counties, many of the soils in the region have a pH between 5 and 6 (a pH of 7 is considered neutral; the lower the pH the more acidic). This acidity derives primarily from the region's high rainfall that is not itself acidic, but leaches acids out of fallen leaves, and the acidic rocks from which the soil has developed. Were our bedrock composed of a more basic (higher pH) rock such as limestone, the soils would also be more basic. Industrially-caused acid rain (pH as low as 3-4) has been known to affect soil pH in places such as the northeast U.S., but there is no evidence of such rain in the north coast of California.

Our soils' moderate acidity does not limit tree health at all. In fact, many of the woody shrubs and trees that grow here, such as huckleberry, rhododendron, azalea, and tanoak, do so precisely because they prefer acidic soils. Throughout the region, tree physiologists have never noticed a particular pattern of symptoms (such as sparse/discolored foliage or stunted growth) that might indicate large-scale nutrient deficiency in trees, as has been observed in other places in the U.S. and Europe associated with the impacts of acid rain.

4. Does moss or lichen growth on trees harm the trees' health?

Moss or lichen growth does not harm trees. The mosses and lichens do not live parasitically on the trees, but only use the trees for support. Mosses, which are a kind of plant, normally thrive in shady, humid conditions. Mosses can be found in either healthy or unhealthy trees. Their presence does not reflect the condition of the tree, but rather the presence of sufficient moisture. Lichens, which consist of a symbiotic relationship between fungi and algae and sometimes a nitrogen-fixing bacteria, normally grow on trees receiving more light and air circulation. Unlike mistletoes, which are plants that siphon nutrients from host trees that they penetrate, mosses and lichens do not invade the tissues of trees and can provide a valuable source of nitrogen to the tree and other surrounding organisms. Lichens are also very sensitive to heavy metals associated with industrial air pollution, and their presence can be an excellent indicator of good air quality in a region. There is no evidence that mosses or lichens acidify soils.

5. My tree has been confirmed as infected with *P. ramorum*. What can I do?

The actions that you or a tree-care professional should take will vary according to the site. Two tree species (tanoak and bay laurel) that are primary forest hosts for the disease have been shown to produce the most inoculum (reproductive material) for the pathogen. Since *P. ramorum* is an exotic (non-native) forest pathogen, removal of these sources of inoculum in most cases should be helpful, just as one would treat an invasion of non-native weeds by removing their seed heads or other reproductive structures. Comparative research trials are currently underway to determine the most effective method of treating *P. ramorum* in the natural forested environment.

P. ramorum is known to infect over 80 tree, shrub, and herbaceous species, so your property should be carefully surveyed and the infection's implications considered for fire risk, tree failure, and the desired vegetation conditions for your property. You can obtain more information about treatment trials and actions you can take by contacting the advisors listed below.

6. Where can I learn more about tree health?

You can learn more about how to promote tree health in oaks and other kinds of trees in the region by visiting www.suddenoakdeath.org or http://danr.ucop.edu/ihrmp/ or by contacting the following people:

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