

# Over Two Decades of Sudden Oak Death in California<sup>1</sup>

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## Abstract

*Phytophthora ramorum* garnered international attention upon its discovery in the summer of 2000 (Rizzo and others 2002), but thanks to genetic information collected from around the state, we know the pathogen has been in California since the 1980-1990s (Mascheretti and others 2008). As the decades pass and the possibility of large-scale eradication passes solidly out of reach, we continue to witness the transformation of our forests. New tree mortality ebbs and flows as pathogen populations contract and expand during years of severe drought followed by seasons with adequate rainfall. Decades later, millions of trees have been lost, and the pathogen continues to spread and kill trees; yet we still have a lot to lose: habitat, carbon storage, natural beauty, as well as other cultural and ecological values.

From the forests of Monterey County along the Central Coast, to Del Norte County in northern California and into southern Oregon, the pathogen, although a clone, behaves quite differently throughout its range. We have observed wildfire interacting with the pathogen to exacerbate fire severity and create dangerous fire suppression conditions and extreme fuel mitigation issues in Monterey County (Cobb and others 2016, Lee and others 2009, Metz and others 2011). In the greater San Francisco Bay Area there is extensive property damage, and park-land degradation. Along the Sonoma and Mendocino County coasts, sudden oak death impacts are combining with those of other non-native forest pathogens to unforeseen eventual effect as dominant tree species are eliminated from coastal vegetation. In the farthest north of the pathogen's range, bay laurel (*Umbellularia californica*) trees rarely harbor the pathogen but for the rest of its range, bay is implicated in driving mortality in almost every study.

Many hope that finding both mating types of *P. ramorum* in Vietnam could yield new insight into resistance mechanisms for our local tree species. Meanwhile, another lineage of *P. ramorum* arrived in the Pacific Northwest instilling fear that hybridization or mutation of an already virulent, generalist pathogen could allow for expansion into new ecosystems.

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In California forests, cumulative tree mortality levels are at an unprecedented high, as is the loss of life and property due wildfire. For coastal California forests, sudden oak death further compounds the challenge to sustain trees and plants that are integral to the health and well-being of the humans, plants and animals that dwell with them.

## **Literature Cited**

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