

Susceptibility to Sudden Oak Death in California Bay Laurel¹

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Abstract

Sudden Oak Death, caused by the water mold *Phytophthora ramorum*, is a plant disease responsible for the death of 100s of thousands of oak and tan oak trees. California bay laurel (*Umbellularia californica*) has been shown to play a key role in *P. ramorum* inoculum build-up and subsequent spread to oaks. While bay laurel appears to vary in susceptibility to *P. ramorum*, little is known about the causes or extent of this variability. An understanding of such dynamics helps in identifying the limits of infection, dispersal, and impact of plant pathogens. In this research, we examine how bay laurel susceptibility to *P. ramorum* is related to bay laurel phenotype, genotype, and environment. Based on data from lab susceptibility trials and field infection data collected from 97 trees from 12 populations in Northern California, we found that lab lesion size and field infection levels varied significantly among both bay laurel trees and populations. The phenotypic trait of leaf area was significantly related to lab lesion size, where bigger leaves produced bigger lesions. Variability in lesion size produced in the lab and infection levels in the field were significantly related to AFLP markers, suggesting a genetic basis to resistance. We also identified markers associated with phenotypic traits putatively involved in conferring susceptibility, including leaf toughness and leaf water content. At the population level, environmental variability significantly explains susceptibility to *P. ramorum*. This work demonstrates how susceptibility to *P. ramorum* in bay laurel depends on genetic, phenotypic, and environmental traits, providing useful information for predicting risk of *P. ramorum* spread from bay laurel to oak and tan oak trees, an important consideration for controlling the spread of Sudden Oak Death.

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