

Ecology of *Phytophthora nemorosa* and *Phytophthora pseudosyringae* in Mixed Evergreen Forests

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Research has shown that *Phytophthora ramorum* is a major threat to California's coast live oak (*Quercus agrifolia*) dominated mixed evergreen forests. Less evident is the role that other *Phytophthora*-associated diseases play in the ecology of these forest communities. Surveys in mixed evergreen forests have revealed two additional *Phytophthora* species, *P. nemorosa* and *P. pseudosyringae*. To learn more about the ecology of these two species, plots were established in mixed evergreen forests outside of the known range of *P. ramorum*. This study addressed the following questions: 1) what are the disease incidence and tree mortality levels associated with *P. nemorosa* and *P. pseudosyringae*? 2) What site and community variables correlate with pathogen presence and disease intensity? 3) Do *P. nemorosa* and *P. pseudosyringae* occupy the same niche or is there some level of ecological differentiation? 4) When both *Phytophthora* species are present, can any patterns be found regarding their presence and abundance, i.e. what is their degree of association? 5) Are there any differences in coast live oak demographics in diseased vs. non-diseased plots?

One hundred, 1/20th hectare (500 m²) circular plots were established at eight sites in coast live oak and bay laurel (*Umbellularia californica*) dominated mixed evergreen forests from Monterey to Marin Co. At each plot, data was collected on tree species, diameter, crown position, health and pests. Cover class of all woody and herbaceous species was recorded as well as slope, aspect, elevation, distance to trail and waterway and number of seedlings. Symptoms (leaf lesions and stem cankers) of *Phytophthora* infection were recorded. Samples of symptomatic tissues were returned to the lab for isolation of the pathogen(s).

A total of 3463 woody plants were surveyed including 1219 coast live oak and 1408 bay. *P. pseudosyringae* was isolated from bay leaves in 40 of the 100 plots; disease incidence on bay in these plots averaged 27%. Cankers caused by *P. pseudosyringae* were found on seven coast live oaks in six plots (a 1.5% infection level in plots with *P. pseudosyringae* present). *P. nemorosa* was found on bay leaves in 22 plots; disease incidence on bay in these plots averaged 59%. *P. nemorosa* was never isolated from a coast live oak. Of the 100 plots, 11 plots had more than one *Phytophthora* species present and 8 of these plots had more than one *Phytophthora* species on the same bay tree. Preliminary logistic regression models show that presence of *P. pseudosyringae* is positively correlated with bay importance value and plot slope and is negatively correlated with plot diversity and distance to waterway. *P. nemorosa* presence is positively correlated with bay basal area/hectare and is negatively correlated with elevation. Further analysis is underway in order to address all of the questions stated above.