This Tree Is Not Big Enough for the Both of Us: Symptoms of *Phytophthora ramorum* on California Bay Laurel Are Lower When Insect Herbivores Are Abundant[1]

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Abstract

Leaves of California bay laurel (*Umbellularia californica*) are considered the primary natural source of inoculum for the devastating forest disease sudden oak death (*Phytophthora ramorum*), and yet this plant and the insects associated with its leaves remain understudied. This is unfortunate due to the role herbivorous insects may play in disease transmission and alterations to plant disease susceptibility. There is also a deficit of knowledge on how landscape-level variability or the effect of microclimate may influence insect presence and about systems involving both a plant's pathogens and its insect herbivores.

Two hundred woodland plots within a 275 km^2 region of Sonoma County have been assessed since 2003 for disease progression. Insect diversity and abundance on leaves of bay have been monitored since April 2014, with species appearing most often from the suborder Sternorrhyncha, which includes aphids, scale, and whiteflies. We have found a negative relationship between insect and pathogen presence on the tree level for California laurel aphid ($p = 0.04$) and one species of armored scale insect ($p = 0.004$).

We are investigating these interactions on a finer scale, including direction of correlation and across two microclimates, in 10 plots at Fairfield Osborn Preserve (December 2015 - May 2016). Both an observational and insect-removal experimental approach is being taken, charting the progression of disease and insect levels through the rainy season. We hope this may inform management strategies to slow spread and cope with this disease that threatens to unhinge native ecosystems.

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