

Early Detection Monitoring of *Phytophthora Ramorum* in High-Risk Forests of California

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Sudden oak death, caused by the recently described pathogen *Phytophthora ramorum*, is an emerging forest disease that has reached epidemic levels in coastal forests of central and northern California. In response to this threat, the federal and state government of California have assembled task forces to devise strategies for management and prevention of further spread of this pathogen. Because the disease may be too extensive to broadly apply control methods, California has established an active monitoring program focused on early detection of pathogen activity at isolated locations, where it may be possible to apply chemical treatments or attempt eradication. As part of this effort, we have combined modeling efforts that evaluate the risk of disease spread with ground surveys to target sampling in the most threatened forests.

Here, we present two years (2003-04) of results from California's early detection survey of *P. ramorum*. A total of 496 locations were assessed for the presence of *P. ramorum* on public land across 38 counties (n = 138 in 2003; n = 347 in 2004). 119 of these sites were located within 10 km of a known occurrence of *P. ramorum* and 376 sites were further than 10 km. Along two transects at each site, leaf samples were collected from all host plants showing potential symptoms of *P. ramorum* and examined using culture and PCR methods. Of the 496 sites assessed, *P. ramorum* was found at 32 of the 119 sites occurring within 10 km of a known occurrence and 2 of the 376 sites occurring further than 10 km. The pathogen was not discovered in any uninfested counties. These results suggest that *P. ramorum* has not spread significant distances over the past two years in California's forest environments. While these results are encouraging, the extensive size of California (408,512 km²) allowed us to assess only a small fraction of the state's high-risk habitats even with targeted sampling and a relatively large sample size. Moreover, almost 80% of California's most threatened forests are privately owned, which presents access issues for early detection and management of disease spread. Given the extensive number and diversity of threatened habitats in California, risk-based site selection appears to be an effective tool for early detection monitoring and protection. This strategy may play an especially important role in identifying isolated infections before they have established significantly.