

The Current State of Knowledge on Operational Sanitation Measures to Lower Risk of *Phytophthora ramorum* Spread and the Need for Further Study¹

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Abstract

We are working to evaluate risks associated with human spread of the sudden oak death (SOD) pathogen, *Phytophthora ramorum*, to currently uninfested areas in California. Port-Orford-cedar (*Chamaecyparis lawsoniana* (A. Murray) Parl.) root disease (POC RD), caused by *Phytophthora lateralis*, has brought awareness that pathogens can be moved in forest settings by materials adherent to vehicles and equipment. Discovery of this human vector prompted *P. lateralis* control measures with notable social and economic costs, such as road closures, vehicle and equipment washing requirements, and standards for sanitizing drafted water.

Despite knowledge that there are distinct biological differences between *P. ramorum* and *P. lateralis*, POC RD-derived sanitation measures have been routinely recommended for SOD. While we know that *P. lateralis* has spread largely via soil-borne inoculum, the most often implicated spread mechanisms for *P. ramorum* do not include this pathway. However, infested soil has been linked to *P. ramorum* spread and persistence in nursery settings. Some epidemiology research suggests past spread in California via recreational activities, and *P. ramorum* has been isolated from boots and bike tires at several locations. Furthermore, streams carrying inoculum from wildland infestations can cause low rates of infection in nursery plants via irrigation. Still, we have little understanding of the potential of infested soil, plant debris, and water to spread the pathogen in forests and urban-wildland interfaces.

We are currently developing ideas for an integrated study that focuses on drafted water and potential soil and debris vectors associated with timber and fire management or arboriculture operations—operations that may present high-spread risk and also bear heavy costs in heavy equipment sanitation. The goal of this study is to identify sanitation measures that present the best combinations of application ease, cost effectiveness, and either elimination or minimization of spread risks.

In a small pilot study, we found that 100 percent of 400 ml samples of soil-vegetation samples (n=22) collected from heavy logging equipment operating in an infested area tested positive for *P. ramorum*. This type of equipment, particularly when transported on a trailer, can carry several hundred liters of soil from one harvest location to another. We also found that the pathogen could be isolated regularly (up to 40 percent of samples) from even very small amounts (<2 ml) of soil leftover after cleaning the majority of soil/debris from equipment. While it is difficult to translate amounts of soil/debris left on equipment to actual amounts of pathogen inoculum and corresponding spread risk, it is prudent that we make a more focused attempt at determining the best methods to quickly rid these potential vectors of viable *P. ramorum* inoculum and ensure that these methods are widely applied in forest operations.

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