Determining the Amount of Soilborne Inoculum of *Phytophthora ramorum* Within an Oregon Tanoak Forest[1]

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Abstract

Phytophthora ramorum continues to cause extensive mortality of tanoaks in southwestern Oregon. Effective management strategies have been developed based on our current understanding of the pathogen's epidemiology. Local dispersal can occur either by canopy throughfall ("top-down") or a ground splash ("bottom-up") pathway. Although the "top-down" aspect of the disease cycle is well understood, the importance of infested soil and leaf litter as contributing factors to the spread of disease remains unclear. To elucidate the epidemiological importance of these "bottom-up" sources of inoculum, our study aims to (i) compare the amount of inoculum washed down through the canopy to that splashed up from the soil and litter, and (ii) to detect and quantify inoculum in relation to soil depth. Over the course of the rainy season, both rainwater and soil samples were periodically collected from within the Generally Infested Area in Brookings, Oregon.

To determine if the amount of soilborne inoculum is at least as much as that derived from throughfall, a tiered bucket design was set up under infested canopies at five different locations. One bucket was set on the ground to collect throughfall and another was placed into the ground to collect throughfall and any splash-up from the surrounding soil and litter. A third bucket was baited and used to detect the presence of *P. ramorum* in real time. To determine the distribution of inoculum in the soil profile, samples were taken at 5, 10, and 15 cm depths and subjected to baiting. DNA was extracted from rainwater in the unbaited buckets and soil from the 5 cm depth. Quantification of *P. ramorum* in these samples will be attempted with qPCR, which should detect differences that will indicate how inoculum from infested canopies and soil contribute to the inoculum pool in these forests.

This information will add to the existing knowledge of disease transmission biology in natural settings, which can inform management strategies aimed at minimizing the local spread of the disease.

[1] A version of this paper was presented at the Sixth Sudden Oak Death Science Symposium, June 20-23, 2016, San Francisco, California.

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