

***Phytophthora* species can be Reliably Detected by Dogs both from Infested Substrates and Infected Plants**

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In recent years, reports of *Phytophthora* detections have increased from plant production facilities supplying plant stock for restoration projects (Garbelotto et al. 2018). When introduced into new natural habitats through infected plant stock, the potential for *Phytophthora* infection and spread is high. Monitoring of nursery stock is key to reducing new introductions into wildlands, however, sampling in nurseries is currently considered too expensive and complex to be performed on a large scale.

This study was undertaken to determine if it would be possible to train ecological scent detection dogs to discern *Phytophthora species* and discriminate *Phytophthora* odors from other scents in leaves and soil of infected plants. The U.C. Berkeley Forest Pathology and Mycology Lab teamed with H. T. Harvey & Associates to develop a *Phytophthora* detection dog pilot study (Swiecki et al. 2018), starting with a single dog.

The training has occurred in phases, first to expose the dog to recognize *Phytophthora* odor in a range of media. Four species of *Phytophthora* - *P. ramorum*, *P. cinnamomi*, *P. nemorosa* and *P. cactorum* – were grown in four different media – soil-water solution, soil-water-pea broth solution, local soil collected under oak trees, and commercial potting soil. The dog had a 100% detection level in blind testing consisting of 10 trials each.

Phase two of the training employed infected *Rhododendron* plants for the scent trials. *P. ramorum* and *P. nemorosa* were inoculated on leaves, while *P. cinnamomi* and *P. cactorum* were soil inoculated. The dog again had a 100% detection success level in blind testing.

We are currently running trials in phase three, i.e. discrimination of *Phytophthora* from co-occurring *Pythium* isolates, to ensure that the detection is genus specific. In addition, we are testing the dog's ability to correctly identify *Phytophthora* infection in plant species other than *Rhododendron* spp.

Results from the study so far suggest that ecological scent detection dogs may offer an innovative and reliable method to survey for *Phytophthora* in a variety of settings. Dogs could offer a rapid way to reliably detect the pathogen in a variety of controlled environments, such as nurseries; to prescreen plants before they are installed at habitat restoration sites; and possibly to identify infected naturally occurring plants and soil in the field.

References

Garbelotto, M.; Frankel, S.J. and Scanu, B. 2018. Soil- and waterborne *Phytophthora* species linked to recent outbreaks in Northern California restoration sites. California Agriculture. 72(4):208-16. <https://doi.org/10.3733/ca.2018a0033>.

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