

Root Associations of *Phytophthora ramorum* and *Phytophthora kernoviae* in U.K. Woodlands¹

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Abstract

Phytophthora kernoviae and *Phytophthora ramorum*, two pathogens recently introduced to the U.K., incite foliar lesions, shoot necrosis, and death of *Rhododendron ponticum*, an invasive weed pervading U.K. woodlands. In infested woodlands, *R. ponticum* serves as an epidemiologically important host, supporting sporulation of both pathogens. Bleeding cankers on trunks of European beech (*Fagus sylvatica*) caused by either *P. ramorum* or *P. kernoviae* are often associated with neighboring infected *R. ponticum*.

Rhododendron ponticum has been removed from several woodlands as an inoculum management strategy, but the long-term efficacy of plant removal is unknown, in part due to lack of knowledge of pathogen persistence in roots and in emerging seedlings.

The potential for *P. ramorum* and *P. kernoviae* to infect roots of *R. ponticum* in U.K. woodlands is unknown. To assess pathogen association with rhododendron roots, roots initiated from natural layering were excavated from two sites infested with *P. kernoviae* and one site infested with *P. ramorum*. At each site, four sets of layered roots were sampled, in addition to the associated leaf litter, rhizosphere soil, and symptomatic leaves. In the laboratory, soil and leaf litter were individually baited using leaf disks of *Rhododendron catawbiense* 'Cunninghams White.' Tissue from symptomatic leaves was embedded in SMA agar for isolation of *Phytophthora* spp. Neither pathogen was baited from rhizosphere soil, but both were routinely recovered from leaf litter. *Phytophthora ramorum* was baited from one set of layered roots; *P. kernoviae* was baited from three sets of roots at one site and from two sets at another site.

A second objective focused on investigating the potential for infection of *R. ponticum* seedlings in a woodland cleared of *R. ponticum* in 2005 for management of *P. kernoviae*. Nineteen seedlings were excavated from the woodland and all foliar lesions were sampled for pathogen isolation. Rhizosphere soil and roots were independently baited with rhododendron leaf disks. *Phytophthora kernoviae* was recovered from foliar tissue on 2 seedlings, from roots of 5 seedlings, and from two samples of rhizosphere soil.

The results suggest that both *P. ramorum* and *P. kernoviae* are associated with *R. ponticum* roots in infested U.K. woodlands. Furthermore, the presence of inoculum in litter but rarely in soil suggests that the pathogens may infect the roots, rather than simply persist on the rhizoplane. Further research is needed to assess the frequency of root associations and to histologically visualize root infections of these two pathogens. These preliminary data suggest that the potential persistence of these pathogens in roots and litter should be considered when managing the diseases in infested woodlands.

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