



INVESTIGATING THE POTENTIAL OF DISEASE CONTROL PRACTICES FOR INTEGRATED MANAGEMENT OF *PHYTOPHTHORA KERNOVIAE* ON MATURE MAGNOLIAS IN THE UK

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P. kernoviae (Pk) a newly invasive *Phytophthora* species was first discovered in native woodlands and heritage gardens in Cornwall, UK, in November 2003. Essentially it is an extremely aggressive pathogen of woodland *Rhododendron ponticum* causing leaf necrosis, shoot tip dieback and defoliation of infected plants. It also but it also attacks inner bark of European beech (*Fagus sylvatica*) causing lethal bleeding cankers. The pathogen forms inoculum on infected rhododendron foliage from where it infects susceptible tree stems in close proximity. However, in heritage gardens a range of exotic plant species are foliage hosts for Pk: *Drimys*, *Magnolia*, *Michelia* and *Pieris*, as well as rhododendron.

Loss of exotic plant species in heritage gardens has negative socio-economic effects for local communities. Not only are the gardens an important source of tourist revenue in south-west England, but cultural and horticulturally valuable plants are housed there. For example part of the 'National Magnolia Collection' occurs on sites in Cornwall, as do a number of 'Champion trees'. Some of these specimens are susceptible to attack by *P. kernoviae*; disease reduces aesthetic value but can also result either in death or removal of infected plants as directed by plant health regulation orders. Many of these plants are well established and losing them not only changes the structure and composition of gardens, but some are irreplaceable because they are unique genotypes that are rare or even extinct in their natural habitats. Gardeners are finding it difficult to maintain the traditional constitution and ambience of the gardens and are concerned that the impacts of the disease may ultimately be felt in decreased numbers of visitors.

Management to reduce and possibly eliminate disease on culturally valuable specimens in gardens is reliant on scientific data. A key aspect of integrated management is removal of primary sources of inoculum, *i.e.* rhododendron, without which other aspects of an integrated approach cannot be considered. Chemical intervention to reduce sporulation and prevent disease advance onto new tissue is a management tool worth investigating on deciduous trees. However, prior to this it is essential to establish if the pathogen survives and overwinters on infected shoots, and whether new infections are initiated from these overwintering infections, in order to select appropriate chemicals and optimise treatments. This study monitored the spread and intensity of disease and determined whether the pathogen survived in first and second year shoots of Magnolia naturally infected with Pk. To do this symptom expression was monitored and recorded over 20 mo and isolation used to confirm the presence of Pk. A bimodal pattern of symptom expression occurred with peaks in spring (May-June) and autumn (October-November). The pathogen overwintered on the furry outer bud scales, in buds, and in leaf scars only in the current year's tissue, which was infected in autumn. Leaf debris also harboured *P. kernoviae* over winter. In spring infection was first evident in blossom and new foliage developing from buds. Further investigation of sanitation practices and chemical applications for disease management are merited on valuable deciduous trees in gardens.