

# Biosecurity Protocols for Heritage Gardens<sup>1</sup>

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## Abstract

This project aims to protect The National Trust (NT) from the increasing number of harmful plant pests and diseases that slip through official controls and threaten our gardens, plant collections and landscapes.

During 2008, the National Trust (NT) with the seconded help of Dr. David Slawson, Head of Pest and Disease Identification Programme, Food and Environment Research Agency (FERA), United Kingdom (U.K.), has developed a suit of biosecurity protocols which we are now implementing at all of our 220 heritage gardens to help lessen the risk of introducing new pests and diseases to our properties. The NT, a U.K. charity formed over 100 years ago to “promote the permanent preservation for the benefit of the nation of sites of beauty and/or historic interest, forever for everyone,” now is one of the largest garden owners in the world. Although the initial driver for the project was the impact of *Phytophthora ramorum* and *P. kernoviae* on the Trust’s gardens, the lessons learned and the measures proposed will be of generic benefit across the increasing number of pests and pathogens that threaten the Trust’s gardens and landscapes.

## Biosecurity. ‘Protecting Ourselves and Others’

During 2008, the National Trust (NT) with the seconded help of Dr. David Slawson, Head of Pest and Disease Identification Programme, Food and Environment Research Agency (FERA), has developed a suit of biosecurity protocols which we intend to implement at all of our 220 heritage gardens to help lessen the risk of introducing new pests and diseases to our properties.

The National Trust is a United Kingdom (U.K.) charity formed over 100 years ago to: “promote the permanent preservation for the benefit of the nation of sites of beauty and/or historic interest, forever for everyone.” Now one of the largest garden owners in the world, it has an estimated 70,000 woody taxa in its gardens. The NT also manages 32 national plant collections and 28 internationally important collections.

The importance of the NT’s collections to worldwide biodiversity has been recognized by, for example, being invited to join the Global Strategy for Plant Conservation as it relates to cultivated plants and plant collections. In addition to our concerns surrounding our important gardens we recognize the threat to our U.K. native species. Although not on NT land yet, the recent outbreaks in west Cornwall

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of *Phytophthora kernoviae* on *Vaccinium* ( bilberry, an integral species of the native heathland habitat mosaic) has highlighted the urgency of addressing issues such as biosecurity to lessen any risk and impact to these important sites and further spread to other species.

It is vital that our gardens are managed in a way that creates an environment that is unfavourable for pests and diseases should they appear. The measures will help reduce the risk of gardens and plant collections becoming infested and the subsequent spread of pests and diseases from infested gardens via our visitors.

## Project Aim - Preventative Conservation

The aim of the project is to protect the NT from the increasing number of harmful plant pests and diseases that slip through official controls and threaten our gardens, plant collections, and landscapes. Although the initial driver for the project was the impact of both *P. ramorum* and *P. kernoviae* on the Trust's gardens, the lessons learned and the measures proposed will be of generic benefit across the increasing number of pests and pathogens that threaten the Trust's gardens and landscapes. The output guidance should be simple, interesting, visual, relevant, user friendly, and cost conscious.

## Biosecurity Project Outputs

Given these threats, it is vital that organizations such as NT, who are the custodians of some of the most significant gardens, parks, landscapes, and plant collections in Europe, take generic measures to protect these important assets. This project represents a start to that process. The project has undertaken a systematic review of both the plant pest and pathogen risks posed to the NT, and the adequacy of the NT's current procedures and practices.

The main output from the project is a series of Plant Quarantine and Biosecurity Guidance Notes, which aim to reduce the chances of new outbreaks occurring and minimize the damage should an outbreak occur. The guidelines include:

1. Sourcing plants.
- 2a. Handling brought-in plants and quarantine areas – general advice.
- 2b. Handling incoming plants and quarantine areas – for gardens of significant plant collections and the plant conservation programme.
3. Use of *Phytophthora* lateral flow devices (LFDs).
4. Cleaning footwear and hands.
5. Managing gardens to reduce the risk of pests and diseases.

A summary poster, containing guidance for visitors on how to help us to protect the garden from introduced pests and diseases, has been produced.

Guidance Note No. 5 is an example of the depth of content. This note includes topics such as:

- plant husbandry (nutrition, spacing, pruning, plant debris, *Rhododendron ponticum*, hygiene);
- infrastructure (paths, fencing, signs);
- water (irrigation, drainage);

- waste disposal (burning, composting, deep burial); and
- monitoring (symptoms, awareness, contacts, training).

All elements provide examples of actual occurrences within normal garden management operations so that the users can relate closely to the written guidance.

## **Predictions and Cost/Benefit Analyses**

It is virtually impossible to predict reliably the future development of outbreaks, and therefore, predicting accurately the cost/benefit analysis for adoption of the quarantine and biosecurity measures is equally difficult. Using *P. ramorum* as an example, we do know that it has killed millions of trees in coastal California, and is removing tanoaks (*Lithocarpus densiflorus*) from the tanoak – redwood (*Sequoia sempervirens*) climax vegetation ecosystem, the cost of which runs into millions of dollars. Closer to home, FERA predicts that, left unmanaged, *P. ramorum* and *P. kernoviae* will infest all susceptible gardens within 20 years. No estimate has been made on the spread to heathlands, but a similar prognosis is credible. A few reasonable scenarios comparing with and without enhanced biosecurity, are presented in table 1.

**Table 1—Example scenarios comparing losses with and without enhanced biosecurity**

<b>Pest/pathogen</b>	<b>No enhanced biosecurity</b>	<b>Enhanced biosecurity</b>
<i>P. ramorum</i> / <i>P. kernoviae</i>	80 percent (160) of all TGs will be affected within 20 years (the remaining 20 percent will not be affected by virtue of the fact that they are on low-risk soil types). 100 percent of the Trust's collections of susceptible plant species will be affected within 20 years. Disease management costs of 160 outbreaks are estimated to be £5.5 million (based on the cost of the current outbreaks at Trust sites). Further costs will also be incurred for replanting the garden, lost revenue from reduced visitor numbers, and disease management of outbreaks on heathland sites.	8 percent (16) of all TGs will be affected within 20 years.  10 percent of the Trust's collections of susceptible plant species will be affected within 20 years. Disease management costs of 16 outbreaks are estimated to be £0.5 million (based on the cost of the current outbreaks at Trust sites). 90 percent reduction in costs will also be incurred for replanting the garden, lost revenue from reduced visitor numbers, and disease management of outbreaks on heathland sites.
Other pests and diseases	20 percent (40) of all Trust gardens will suffer a serious outbreak of a new plant pest or disease in the next 10 years.	2 percent (4) of all Trust gardens will suffer a serious outbreak of a new plant pest or disease in the next 10 years.
For example, Oak processionary moth	In the next 5 years, five gardens in London and the southeast will have to close at certain times because of public health concerns (asthma and urticaria rash).	In the next 5 years, one garden in London and the southeast will have to close at certain times because of public health concerns (asthma and urticaria rash).

## Way Forward

The NT, recognizing the important need that we should all share responsibility and experience, has initiated the formation of a biosecurity working group made up of key stakeholders in the U.K. which will share good practice and guidance with other similar organizations, major garden owners, and the nursery trade. The objectives of the group are to:

1. Raise awareness amongst the general public.
2. Raise awareness amongst the professional gardening community.
3. Provide a single voice to government.
4. Create a fast communications network (email) group.
5. Explore ways in which valuable plants in U.K. collections can be protected for the very long term.

The NT will also look at introducing the following items to help raise awareness of staff, supporters, and general public by:

1. Including a quarantine and biosecurity module in the NT Careership (trainee gardener) programme.
2. Producing a guidance note for visitors (there are approximately 15 million visits per annum to NT gardens).
3. Commissioning an article for NT members magazine (issued to 3.5 million members).