

**Report on the Forestry Commission Re-Survey of Woodlands  
2006 to Assess the Level of Incidence of  
*Phytophthora ramorum* and *Phytophthora kernoviae*  
in Woodlands in England and Wales**

Forestry Commission  
Plant Health Service

## Summary

Between **June and August 2006**, the Forestry Commission (FC) undertook a re-survey of 126 woodlands in England and Wales. These woodlands, in admixture with rhododendron and/or *Vaccinium*, had initially been originally surveyed between January and August 2004. The 126 woodlands were located in 106 10km grid squares. In 16 of the woods, symptomatic material was tested using Lateral Flow Devices (LFD's) and these showed up positive for *Phytophthora*. 25 samples were sent to the Central Science Laboratory (CSL) for testing, of which only one, from a wood in Hampshire, tested positive for *P. ramorum*.

## Background

*Phytophthora ramorum* is a fungus-like pathogen, which has been identified as the causal agent for the condition known as Sudden Oak Death. The first evidence of it in Britain was found during April 2002 on a viburnum but since then it has been found mainly on rhododendrons in nurseries and garden centres. In November 2003 the first evidence of an established tree having the disease was confirmed in Sussex. Further infections were subsequently confirmed on trees in historic gardens in Cornwall. To date (November 2005) a total of 54 infected trees have been recorded. Rhododendrons were present on all of these sites.

Between **January and April 2004** the first major FC *Phytophthora ramorum* survey was carried out focusing on locations where rhododendron was found growing in admixture with trees. Britain was divided into high-risk and low-risk areas based on climate. A total of 1348 sites were identified for the survey of which 1217 were high-risk sites. In England, 395 sites were surveyed, in Wales, 310, and in Scotland 512. This was complemented by surveys on a further 131 low-risk sites in England and Scotland. A total of 335 samples showing symptoms of the disease were collected. Samples were sent either to the Central Science Laboratory (CSL) in York or the Scottish Agricultural Science Agency (SASA) in Edinburgh. All samples were tested and found to be **NEGATIVE**. The results of the survey can be found on the FC website ([www.forestry.gov.uk/planthealth](http://www.forestry.gov.uk/planthealth))

Significant areas of infection were identified in Cornwall by Defra's Plant Health and Seeds Inspectorate while carrying out survey work, including surveys in woodlands associated with heritage gardens. It was decided that the FC's survey programme would continue in England and Wales only and during the **Summer and Autumn 2004**. 109 woods were inspected in 94 10km grid squares. Samples were taken from 73 locations but none proved positive. During August 19 water bait samples were taken of which 3 proved positive for *P. ramorum*. The results of this survey have been published on the FC website [www.forestry.gov.uk/planthealth](http://www.forestry.gov.uk/planthealth)

At this time it was agreed that we would not continue with a formal programme of surveys in Scotland, where Pest Risk Analysis indicated a low level of risk, although ad-hoc sampling would be carried out as part of surveyors' normal duties.

During the latter part of 2004, a second and previously unknown *Phytophthora*, now formally named *P. kernoviae*, was discovered in Cornwall, affecting rhododendron and some trees. A Management Zone was set up to contain the disease and this is defined in the Plant Health (*Phytophthora kernovii* Management Zone) (England) Order 2004.

<sup>1</sup> Prior to formal naming, *Phytophthora kernoviae* was referred to both as *P. kernoivii* and *P. Taxon C*

A smaller outbreak was also discovered in South Wales and an infected nursery was also identified in Cheshire although this outbreak was eradicated. During 2005 as a result of intensive surveys by Plant Health & Seed Inspectorate (PHSI) of Defra further outbreaks of both *P. ramorum* and *P. kernoviae*, were discovered in Cornwall. In 2006 *P. kernoviae* was found on a single 150-year old *Rhododendron ponticum* in a historic garden in Cumbria. The infected rhododendron has now been destroyed

In 2005, the **Interdepartmental *Phytophthora* Programme Board** decided that, in the light of these continuing outbreaks, it was necessary to revisit, over a 5 year period, all those high and low risk sites which were surveyed in 2004, with 20% of the total being inspected annually. This would determine whether they were still disease free.

The 2005 survey revisited a total of 149 woods of which 19 had *Vaccinium*. Of these, 41 were Forestry Commission managed and 108 were privately owned. Of the sites revisited in 2006, 44 were Forestry Commission managed and 82 were privately owned.

### Objective of the Survey

The objective of the first survey was “to obtain an understanding of the distribution of the fungal pathogen *P. ramorum* on rhododendron growing in admixture with trees in woodlands across Britain, in order to inform policy development on eradication and containment, or alternatively, management of this potentially devastating disease.” This objective is still valid. However, the increase in the number of *P. ramorum* outbreaks in Cornwall and in other parts of England and Wales, as well as discovery of *P. kernoviae*, prompted the Programme Board to initiate a re-survey of the 2004 sites to ascertain if those sites especially the high-risk sites, were in fact still disease-free.

### Sampling Protocol & Timetable

The Principal Statistician at Forest Research randomised all the grids surveyed between January and March 2004 and from this randomisation a spread of sampling points (grids) has been produced for the 5 year period. Those sites surveyed between May and August 2004 have been allocated over the period 2007 -2009 (see **Appendix II**) and a scatter map produced (see **Appendix III**)

Surveying was carried out as per the original protocol produced by Dr Steve Lee in December 2003 and subsequently updated by Dave Tracy in 2005. This was included in the **Survey Plan 02/06/07** which was produced by Dave Tracy which formalised the survey procedures. Woodlands in admixture with rhododendron and/or *Vaccinium spp.* were to be surveyed. Samples taken from suspect rhododendron and *Vaccinium* were to be sent to CSL in York for analysis after testing with Lateral Flow Devices, developed by CSL, to ascertain if samples taken were showing the symptoms of *Phytophthora*. To check on the accuracy of the LFD's some negative samples were sent to CSL for analysis. The survey was carried out between **June and August 2006**.

### Survey Data Summary

No 10KM GRIDS	No SITES	No sites <i>Vaccinium</i> present	No sites FE managed	No sites sampled	No samples taken
106	126	12	44	16	25

## **Conclusion**

The woods re-surveyed throughout England and Wales gave a balanced spread across the country and the results indicated that since the original survey in 2004, no changes in the condition of the woods had occurred, except for the one wood in Hampshire. This wood was intensively surveyed by FC and PHSI in September, and although further samples were taken from it, these were found to be negative. While the absence of *P. ramorum* and *P. kernoviae* from the woods re-surveyed is encouraging, it cannot be assumed that both pathogens are absent from all woodlands. The continuing discovery of both pathogens in woodlands in Cornwall indicates that a programme of re-survey and new survey work is likely to continue for the foreseeable future.

## **Next Steps**

In the area of greatest infection, Cornwall, a *Phytophthora kernoviae* Management Zone (PkMZ) was set up in December 2004. Currently a programme of containment through clearance of rhododendron has started at the sites with the highest risk of transferring the disease. Outwith the zone, PHSI and the FC have carried out further inspection of woodlands in Cornwall where woods are in admixture with rhododendrons and/or *Vaccinium*. In 2005, a further 14 woods in Cornwall, which were previously unsurveyed, were inspected and the report can be found on the Forestry Commission's Plant Health website [www.forestry.gov.uk/planthealth](http://www.forestry.gov.uk/planthealth). In 2006 a further 67 previously unsurveyed woods were inspected by the Forestry Commission and the report for this survey can also be found on [www.forestry.gov.uk/planthealth](http://www.forestry.gov.uk/planthealth)

The National Re-Survey will continue in 2007 when a further 150+ woods will be surveyed.

## **Acknowledgement**

The Forestry Commission wishes to acknowledge the full co-operation and support given to its surveyors by woodland owners or their managers who were approached for permission to survey their land.

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## **Appendix I - Survey Team Details**

Assessors from the Technical Services Unit (TSU) of Forest Research carried out the survey. These surveyors had undertaken training from Plant Health staff in January 2004 prior to the commencement of the first *P ramorum* survey or if new to the operation, have been trained by an operator who has had previous experience in this type of survey work.

### **TSU Survey Team Members:**

#### **Wykeham Fieldstation:**

Bill Riddick  
Lee Cooper

#### **Shobdon Fieldstation**

Jason Jones

#### **Talybont Fieldstation**

Ben Griffin  
Dai Evans  
Tony Price

#### **Alice Holt Fieldstation**

Steve Coventry  
Kate Harris  
Ian Keywood

#### **Exeter Fieldstation**

Barnaby Wylder  
Alan Ockenden  
Tony Reeves

In the first sample 141 sites were selected that leaves a further 393 from the Jan-Mar 2004 survey to be sampled over the next four years. This will be 100 for years 2, 3 and 4 and 93 in year 5. The tables below show the allocation by year to area and region.

Sample Area	1	2	3	4	5
NX	0	6	0	1	0
NY	7	3	2	1	2
SD	6	6	9	9	8
SE	3	4	5	1	1
SH	14	12	9	9	4
SJ	5	4	5	3	4
SK	1	2	2	2	0
SM	2	1	2	2	1
SN	21	11	11	17	13
SO	13	10	5	12	7
SR	0	0	0	1	0
SS	4	5	1	3	1
SS_E	12	6	5	4	7
ST	6	6	7	0	3
ST_E	10	3	4	7	8
SU	9	7	7	4	4
SW	4	0	2	7	5
SX	11	9	14	3	16
SY	8	1	1	2	3
SZ	2	1	3	2	0
TQ	3	9	6	10	6
Total	141	106	100	100	93
Plus grids from May-Aug. 2004 <sup>2</sup>			43	43	43
<b>TOTAL</b>	<b>141</b>	<b>106</b>	<b>143</b>	<b>143</b>	<b>136</b>

<sup>2</sup> still to be allocated to grid square area

The numbers of sites per year per region are

Sample Region	1	2	3	4	5
1	30	25	25	21	15
2	58	39	31	44	33
3	53	36	44	35	45

Expressed as a percentage of the regional sample

Sample Region	1	2	3	4	5
1	26	22	22	18	13
2	28	19	15	21	16
3	25	17	21	16	21

Indicates a reasonably uniform spread with no significant differences. A plot of the samples is given below.

