

**Report on the Forestry Commission Re-Survey of Woodlands
2008 to Assess the Level of Incidence of
Phytophthora ramorum and *Phytophthora kernoviae*
in Woodlands in England, Wales and Scotland**

Forestry Commission
Plant Health Service
Edinburgh
March 2009

Summary

Between June and September 2008, the Forestry Commission (FC) undertook a re-survey of 201 woodlands in England, Wales and Scotland. Scotland was included in this year's survey following the finding of both *Phytophthora ramorum* and *P. kernoviae* in late 2007. These woodlands, in admixture with rhododendron and/or *Vaccinium*, had initially been originally surveyed between January and August 2004. The 201 woodlands were located in 150 10km grid squares. In 24 of the woods, 36 samples were taken and sent for analysis to the Central Science Laboratory (CSL) for samples collected in England and Wales or the Science and Advice for Scottish Agriculture (SASA) in Edinburgh for samples collected in Scotland. Three samples tested positive for *P. ramorum*, one each from woods in Cornwall, West Sussex, and Gloucestershire and one sample for *P. kernoviae* from a wood in Kent.

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 (March 2009) a total of 30 trees have bleeding lesions and 58 trees have foliar infections. Infected 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 from England and Wales were sent to the Central Science Laboratory (CSL) in York and for samples from Scotland to the Scottish Agricultural Science Agency, now the Science and Advice for Scottish Agriculture (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

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

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.

¹ Prior to formal naming, *Phytophthora kernoviae* was referred to both as *P. kernovii* 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. To date (March 2009) a total of 63 trees have bleeding lesions and 41 trees have foliar infections. Infected rhododendrons were present on all of these sites

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. To date surveys have been carried out in 2005 and 2006 and their reports can be found on

www.forestry.gov.uk/planthealth.

In Scotland since 2003 SG-RPID has conducted annual surveys during which specialist gardens, parks, estates and urban landscaped areas have been examined for both *P. ramorum* and *P. kernoviae*. In September 2007 the first outbreak of *P. ramorum* in an established garden in Scotland was confirmed. Since then there have been a further six outbreaks of *P. ramorum* and two of *P. kernoviae* all in garden sites. As a result of these findings Scotland was included this year in the National Re-Survey. Further information on the Scottish outbreaks can be found on:

<http://www.scotland.gov.uk/Topics/Agriculture/plant/17937/Phytophtras/Introductiononphytophtho>

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, in 2005 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 2005 -2009 (see Appendix II) and a scatter map produced (see Appendix III). For Scotland the Principal Statistician randomly selected 50 grid squares for re-survey in 2008.

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 01/08/09, produced by Dave Tracy and 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 either CSL or SASA for analysis. Lateral Flow Devices may have been used to ascertain if samples taken

were showing the symptoms of *Phytophthora*. If the surveyor was unsure even after using the LFD, samples were sent for analysis. The survey was carried out between June and September 2008

Survey Data Summary

No 10KM GRIDS	No SITES	No sites Vaccinium present	No sites FE managed	No sites sampled	No samples taken	No of positive samples
150	201	53	73	24	36	4 from 4 sites

3km. Surveys

The procedure when a positive is found is to initiate a 3km survey around the outbreak site. Results of these surveys are:

- **Gloucestershire:** 40 further positives found all for *P. ramorum*. Notices for destruction issued by PHSI.
- **West Sussex:** A further one positive was found.
- **Kent: Over** In the woodland a further 4 positives were found. However if the garden is included a further 30 positives for *P. kernoviae* were found within the gardens. 3.82 ha of rhododendrons from the infected woodland was removed and destroyed.
- **Cornwall:** This finding was in an area currently under containment by PHSI who will carry out any 3 km surveys

Conclusion

While there has been little change in the condition of the majority of woods since the 2004 survey, the further findings of *P. ramorum* in Cornwall and West Sussex, the major outbreak of *P. ramorum* in Gloucestershire and the finding of *P. kernoviae* in Kent is a worrying development. In addition the increase in the number of findings of *P. ramorum* and *P. kernoviae* in Scotland, adds to the concern that the disease is continuing to spread, albeit slowly.

Next Steps

In 2008 the Forestry Commission and Defra undertook a policy and science review which involved consultation with our stakeholders. Two options, which were proposed, were:

- **Option 1:** Continue to meet EU minimum requirements on control of *P. ramorum* and remove all controls against *P. kernoviae*, other than maintaining a ban on the movement of infected plants to other countries. This option recognises that the minimum EU control levels of *P. ramorum* are under review and invites comments on where future levels should be set.
- **Option 2:** Increased activity, aimed at reducing the level of inoculum to epidemiologically insignificant levels; by removal of infected sporulating hosts (primarily rhododendrons) in woodlands and the wider environment; combined with enhanced containment and eradication measures in infected gardens and nursery sites, the identification and control of any new outbreaks.

Consultees agreed, by a significant majority, that Option 2 was their preferred option and this was given Ministerial approval in January 2009. This Option costing £25m over 5 years will be managed by Defra and the Forestry Commission and will apply in England and Wales only.

Separate arrangements will be put in place in Scotland where a similar consultation, with an additional option of continued action at the same level was offered, but rejected.

The reports on the surveys carried out by the FC since 2005 can be found on the Forestry Commission's Plant Health website www.forestry.gov.uk/planthealth.

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:

Newton Fieldstation:

Steve O'Kane

Talybont Fieldstation

Dai Evans

Alice Holt Fieldstation

Steve Coventry

Exeter Fieldstation

Barnaby Wylder

Alan Ockenden

Fineshade Fieldstation

Jake Thompson

Grateful thanks are also due to Liz Richardson of Fineshade Fieldstation who acted as survey co-ordinator

Randomisation of Grids

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 ²			43	43	43
TOTAL	141	106	143	143	136

² 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.

