

**Report on the Forestry Commission Re-Survey of Woodlands
2009 to Assess the Level of Incidence of
Phytophthora ramorum and *Phytophthora kernoviae*
in Woodlands in England, Wales and Scotland**

Forestry Commission
Plant Health Service
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Summary

Between June and October 2008, the Forestry Commission (FC) undertook a re-survey of 242 woodlands in England, Wales and Scotland. These woodlands, in admixture with rhododendron and/or *Vaccinium*, had initially been originally surveyed between January and August 2004. The 242 woodlands were located in 209 10km grid squares. In 31 of the woods, 4 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. Ten samples tested positive for *P. ramorum*, one a wood in Lancashire, two samples from a wood in Wales, Dorset and Devon and three samples from two sites in Cornwall. There were no positives in Scotland.

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.

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*¹ 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.

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.

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 and in 2008 Scotland was included the National Re-Survey of Woodlands for the first time. There are now a total of 18 outbreaks in Scotland, 15 of *P. ramorum* and three of *P. kernoviae*. They are all in garden sites although a woodland close to a garden with *P. ramorum* was also found to have the disease.. 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 109 grid squares for re-survey in 2009.

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
209	242	38	107	31	44	10 from 6 sites all in England & Wales

The reports on all 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.

3km. Surveys

The procedure when a positive is found is to initiate a 3km survey around the outbreak site. However due to the settlement on Defra of £20m to combat Phytophthora, Fera will carry out any 3km surveys in England and Wales. In Scotland 3km surveys around any outbreak site will continue to be carried out by the Forestry Commission.

Conclusion

While there has been little change in the condition of the vast majority of woods since the 2004 survey, the further findings of *P ramorum* in 2009 in Cornwall, Dorset, Devon, Wales and Lancashire, which when added to the other findings since 2006 and the increase in the number of findings of both pathogens in Scotland adds to the concern that the disease is continuing to spread, albeit slowly.

Next Steps

Surveys will continue in 2010.

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:

Colin Smart
Calum Murray
Sandy Bowran
Jeremy Thomas (contractor)

Ae Fieldstation

Harry Watson
James Duff

Talybont Fieldstation

Dai Evans
Tony Price

Alice Holt Fieldstation

Steve Coventry

Exeter Fieldstation

Barnaby Wylder
Alan Ockenden
Tony Reeve

Fineshade Fieldstation

Jake Thompson
Lee Cooper
Paul Turner

Grateful thanks are also due to Liz Richardson of Fineshade Fieldstation who acted as survey co-ordinator for England and Wales and Sam Catchpole who acted as survey co-ordinator for Scotland

Randomisation of Grids - England & Wales

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.

