

***Phytophthora ramorum* in Scotland: Is It All Over?¹**

Alexandra Schlenzig²

Abstract

Phytophthora ramorum was found for the first time in Scotland in April 2002 on some *Viburnum tinus* plants in a nursery. Seventeen more outbreaks were confirmed in the same year, all on plants moving in horticultural trade. Phytosanitary emergency measures to eradicate the disease were taken, such as destruction of infected plants followed by movement restrictions for potential hosts in the affected premises and increased monitoring. These measures proved to be successful. Already in the following year the number of outbreaks declined dramatically to six, followed by five in 2004, three in 2005, and none in 2006. A new outbreak in January 2007 brought the number of outbreak sites up to 22. With the exception of one private garden, the disease occurred only in nurseries and garden centres.

Key words: *Phytophthora ramorum*, Scotland, monitoring.

Introduction

Around the year 2000 it emerged that the so called “sudden oak death” pathogen was already present in German and Dutch nursery stock on *Rhododendron* and *Viburnum* since 1993. Concerned about the devastating impact this disease has on oak and tanoak trees in the western United States the Scottish Executive Environment and Rural Affairs Department (SEERAD) in conjunction with the Scottish Agricultural Science Agency (SASA) initiated a survey of nurseries and garden centres in July 2001. The disease was then found in April 2002 on some *Viburnum tinus* plants in a nursery in the East of Scotland. Seventeen more outbreaks occurred the same year.

In May 2002 Scotland followed England and Wales and introduced emergency legislation to prevent the further spread of the disease: the “Plant Health *Phytophthora ramorum* Order”. The Scottish emergency measures were replaced by the very similar EU Commission Decision 2002/757/EC from the 1st of November 2003. In brief, the import of susceptible plants and plant material from infested areas of the U.S. is prohibited. Within Europe the movement of listed host plants is controlled and requires a valid plant passport. This EU legislation has been reviewed regularly and amended, for example to include new host plants.

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² Scottish Agricultural Science Agency, 1 Roddinglaw Road, Edinburgh EH12 9FJ, UK, Corresponding author: Alexandra Schlenzig, Alexandra.Schlenzig@sasa.gsi.gov.uk.

Surveillance

Survey Sites

Scottish nurseries registered with SEERAD for trading with plants listed in the Plant Health (Scotland) Order 2005 are inspected routinely twice per year. Because of the high number of findings during 2002 the number was increased to four inspections per year. If a nursery bordered on woodland or a park with host plants present, the surrounding area was also observed.

Public gardens and parks were surveyed. To narrow down the search they were chosen on the base of new plantings of *Rhododendron* or *Viburnum* within the last five years or vicinity to outbreak nurseries. Climatic conditions were also taken into consideration. In 2003 and 2004 50 and 80 sites, respectively, were inspected. In 2006 40 landscape sites were targeted.

A Forest survey, concentrating on sites with wild rhododendron undergrowth, was undertaken by the Forestry Commission in early 2004 and included 500 Scottish sites.

Survey Results

Samples taken by the SEERAD inspectors were submitted to SASA. Diagnosis was based on morphological features after plating on V8-PARPNH medium (Jung and others 1996) and conventional PCR as described in Schlenzig 2006.

In 2002, 121 samples were tested for *P. ramorum* and 32 of them were positive, coming from 18 different outbreak sites (fig.1). One of the outbreaks was on a recently planted *Viburnum x bodnantense* in a private garden. All other outbreaks were in nurseries or garden centres. In 2003, 202 samples were taken and 15 of



Figure 1—Outbreak sites in Scotland.

they were found to be positive, coming from six different outbreaks. Four of them were on sites that had already outbreaks the year before. In 2004 only five out of 206 samples tested positive. These samples came from five different outbreaks, of which only one was a new outbreak site. In 2005, 78 samples were tested of which eight were positive coming from three different outbreaks. All of the sites had already outbreaks in at least one of the previous years. In 2006, 48 samples were taken and none were positive.

Apart from the above mentioned exception in 2002, all outbreak sites were nurseries, garden centres or wholesalers. The pathogen has so far never been found in an area surrounding an outbreak site nor was it found in any of the garden, woodland, or landscape sites. Most commonly found was *P. ramorum* on *Viburnum* with 31 positive samples, especially *V. tinus*; followed by *Rhododendron* spp. with 27 positive samples (table 1). The only other host species found was *Syringa vulgaris*, which was confirmed as new host (Beales and others. 2004).

Table 1—Host plants for *Phytophthora ramorum* in Scotland

<i>Host</i>	<i>Number of findings</i>
<i>Viburnum tinus</i>	23
<i>Viburnum x bodnantense</i>	3
<i>Viburnum farreri</i>	3
<i>Viburnum davidii</i>	1
<i>Viburnum plicatum</i>	1
<i>Rhododendron</i> spp.	27
<i>Syringa vulgaris</i>	2

Discussion

The introduced measures against *P. ramorum* have been very effective in Scotland. Although originally the pathogen was detected in a relative high number of nurseries, the number of outbreaks decreased already remarkably in the next year and even no outbreaks at all in 2006 (Fig. 2). Essential for the success was the detection of the disease in an early stage before it was able to establish itself. Scotland was one of the first countries in Europe to find *P. ramorum*. Supported were the emergency measures through the peripheral location of Scotland with limited trade of host plants.

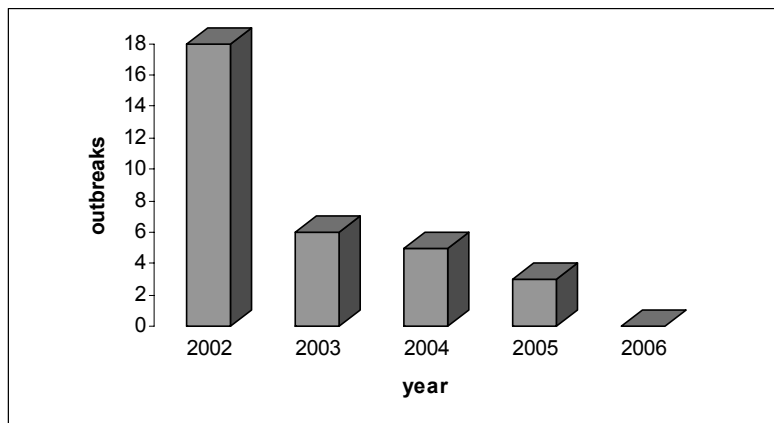


Figure 2—Number of outbreaks in Scotland.

Although in almost 90 percent of the cases the outbreaks could be linked to recent imports of host plant material, in some cases the origin of the disease remained unclear. That was the case when the disease occurred on own propagated stock or on plants imported long ago (a year or even longer). This raises the question how long the pathogen can remain in its host in a latent stage. There might also be the possibility that the pathogen is introduced to a nursery with plants that are not known to be host plants. These plants might show atypical or weak symptoms or no symptoms at all, and might therefore be overlooked by the inspectors.

Despite the positive development it is important to stay vigilant as a new outbreak in early 2007 has shown. *Phytophthora ramorum* is still widespread in Europe and as long as host material is traded there is always the danger that the disease will re-appear.

Literature Cited

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