

Notes on a Visit to Cornwall to See Phytophthora on Rhododendrons

1.0 Introduction On Tuesday, 8th May 2007, I attended an Open Day organised by the South West Branch of the Royal Forestry Society. The venue was a famous garden in the far west of Cornwall and the subject was Phytophthora.

I was unable to attend the second half of the day which was held in woodland near Redruth. Its content was more applicable to forestry and was intended to demonstrate serious Phytophthora damage to poncticum thickets and mature beeches.

2.0 Format The day was led by the resident Head Gardener and the DEFRA Scientific Officers who have been seconded to The Phytophthora Project together with their opposite numbers from the National Trust and the Forestry Commission for England. We walked around the gardens for the greater part of the morning seeing a wide variety of plantings of varying character, history and age. We also witnessed many signs of disease.

3.0 Phytophthora There are two species of Phytophthora which are causing the current levels of concern:-

Phytophthora ramorum has been causing problems in the United States since the early 1990s and has had a major impact on forestry operations in the U.S. North West. It has been reported in fourteen European countries mainly as a result of the distribution of infected shrubs by nurseries eg. rhododendron, viburnum and camellia. It is now found outside nurseries in gardens and woodland in the UK, Netherlands, Germany and Norway.

Phytophthora kernoviae (literally *Cornish* Phytophthora) was identified in November 2003 in the UK. It attacks the leaves and stems of rhododendrons and causes lethal lesions on beech and other trees. It has, so far, been found on relatively few host plants but appears even more lethal than *P. ramorum*. Significantly, it was found in New Zealand in March 2006.

4.0 Similarities There are similarities between the two:-

- Both are aerial Phytophthoras and are “ primary pathogens”.
- Both cause similar damage to leaves, shoots and branches of exotic and native species such as rhododendron etc.
- Both cause major lesions on the trunks of both exotic and native trees, especially beech.
- Both have apparently been introduced and are invasive.
- Both thrive in moist, temperate climatic conditions (typical of Cornwall).

5.0 Differences There are also differences between the two:-

- *P. ramorum* has been found on a far wider variety of host plants.
- Whilst both infect rhododendron, viburnum, camellia etc., *P.kernoviae* has also attacked magnolia, pieris and michelia.
- *P. ramorum* is very often found in nurseries (at least 500 cases in the UK!) , *P kernoviae* has only been found in two nurseries.
- *P. kernoviae* would appear to be the more aggressive of the two and more likely to pop up in the wider environment.

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6.0 How do they spread? Both Phytophthoras can be spread by humans and animals walking through infected areas but by far the most likely reason for spread, especially over long distances, is the movement of nursery stock.

P. ramorum is more often associated with watercourses etc. and is spread by water splash,- *P.kernoviae* less so. Misty weather can spread both.

If badly infected plants are close to healthy ones in moist wet conditions, there will probably sufficient “inoculum” floating about in the enclosed atmosphere to spread the infection. Raintraps have been installed at the garden we visited at considerable distances from any shrubs or trees. Phytophthora has been found in the rainwater samples collected by these traps.

7.0 Symptoms. During our visit we saw leaves, twigs and branches dying and ending up black and very dead! These symptoms spread to affect the whole plant or groups of plants. The leaves of infected plants usually develop dark brown or black spots or blotches, often, but by no means always, between veins or either side of the central vein. We also saw bleeding lesions on large trunks of magnolia etc. These usually seem to be fatal. Whilst our garden was widely and badly infected, the problem was not so immediately obvious because many infected plants or groups of plants had already been removed and the areas replanted.

We were shown a magnificent specimen of *Magnolia delavayi* approx. 40ft high and 30ft through. It was growing alongside and touching an equally fine *Magnolia sargentiana robusta*. The *M.delavayi* showed leaf spotting early this Spring and tested positive for *P. kernoviae*. In the interval between the lab tests and our visit, it had shed approx. a third of its leaves and had developed a large, bleeding lesion on its trunk. The discussion between the Head Gardener and the Scientific Officers was whether the *M. delavayi* should be removed altogether or whether it was worth coppicing it (virtually at ground level) to induce strong shoots which might, because of their vigour, have some chance of survival. No one was optimistic about the chances of the *M. sargentiana*.

8.0 Current Position At the time of our visit, 46 sites had been recorded as infected with *P. ramorum*, 10 sites with *P. kernoviae* and 23 sites with both. Sadly, it is of the nature of the Phytophthoras that old established “heritage” gardens are the most likely to be infected. This is because there is a tendency for these to be located in moist, rainy areas, often affected by mist. They also tend to be over-mature (therefore the plants are less vigorous) , over-grown and under-gardened (no longer sufficient gardeners).

9.0 The Cure There is, as yet, no cure except the burning of the entire plant including its roots, leaf litter etc and the sterilisation of the soil. There is some talk of injecting very valuable trees/plants to control (not eliminate) the spread of the disease but after the failure of this method in the case of Dutch Elm Disease, there is little conviction that this will work.

10.0 Control This is proving very difficult also. The only success so far has been the control of outbreaks in nurseries. Here, burning all infected plants and the source batches together with their compost and leaf litter has usually resulted in the elimination of the infection.

Elsewhere, it is a different story and control is proving difficult and costly. In both gardens and woodland, *Rhododendron ponticum* is seen as public enemy No 1. *R. ponticum* is itself particularly prone to infection, especially when it grows in extensive thickets. The elimination of *ponticum* is seen as the most important single precaution that could slow down the spread of phytophthoras. This may apply to woodland and forests even more than gardens. In either environment, the cost of removing *ponticum* is very high and the process slow. Sadly, too, re-infection has already occurred on sites from which *ponticum* has been removed.

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In large gardens where rhododendrons, magnolias and camellias are a feature, the clearance of ponticum and other susceptible or infected species brings with it a whole new set of problems, especially the loss of all important shelter-belts. Our Head Gardener was continually struggling with this problem. He was at a loss to know what species to use for replanting because many of the plants, which are effective in providing shelter quickly, have already proved susceptible to infection.

This leads naturally to the other effective (it is claimed) measure of control – the improvement of the micro-climates in the gardens. The Phytophthoras thrive in sheltered, hemmed-in environments, often with high levels of shade and moisture – just the conditions in which many rhododendrons and other ornamental species thrive and which are often a feature of the great Cornish gardens. Removing/reducing shade, shelter, standing water etc. and letting in the wind will all discourage the Phytophthora but, often, the precious trees and shrubs too. Phytophthora has been found on *R. ponticum* growing in open and exposed sites but the symptoms have been far less serious and almost certainly survivable.

Clearly, it is very early days in the search for effective and affordable control methods. At the moment the process is throwing up more problems than it is solving.

11.0 Loss of historic and other special plants At the garden we visited they are concerned by another problem – the possible loss altogether of historically and horticulturally important cultivars of rhododendron, magnolia etc. Several old and fine hybrids, which are considered to be in this category and which have become infected, are being kept going for as long as possible by various means. In the meantime, Cornwall's Duchy College has initiated a micro-propagation program and is already having considerable success with many but not all of these threatened species and hybrids.

12.0 A nuisance like honey-fungus? I have heard it suggested by experienced rhododendron growers and rhododendron garden owners that Phytophthora has been around for many years and has been no more damaging than, say, honey-fungus. I put this to the senior DEFRA Scientific Officer who readily admitted that the Phytophthoras may have been present in Cornwall for longer than suspected but argued that pathogens of such virulence and destructiveness as those which they were now encountering could never have been put in this category. He did agree, however, that the global warming which we now appear to be experiencing ie. warmer, wetter winters and hot, drier summers could well benefit the Phytophthoras and steadily increase their virulence.

13.0 Research and Publicity There are various research projects in several countries but most are still in progress, so much confusion still exists in scientific circles as to the real facts of these Phytophthora outbreaks. Nor does there appear to be any consensus on control methods. In the meantime, all the Scientific Officers we met were most anxious that we should be low key and discreet in publishing or speaking about what we saw and thought. They are very sensitive about alarmist and inaccurate press reporting.

14.0 Conclusions

- It is difficult to be clear or sure about anything at the moment. Hard facts and research results seem to be very scarce.
- My guest at this event (a rhododendron, camellia and magnolia grower of 30 years + experience) was not convinced that the Cornish Phytophthoras were in the garden-killer category but thought they could be like a bad attack of honey-fungus- unfortunate but a fact of life.
- I am afraid that I am not nearly so sanguine. Based on what I saw, I think it is conceivable that these Phytophthoras spell the end of large collections in large gardens with wet, warm and misty maritime climates. Certainly the problem as we witnessed it, seemed totally out of control and I fear for the future of this great garden.

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- In the meantime, the greatest risk for the average rhododendron, camellia and magnolia grower seems to be the unwitting purchase of infected nursery stock. In this connection it is good to report that most specialist nurserymen now seem fully alive to the threat to their businesses that Phytophthora constitutes and are taking appropriate precautions.

C.H.T.B.
May 2007