NEWSLETTER

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SPECIAL EDITION ON PHYTOPTHORA

From the Editor

The very serious damage caused to British gardens by *Phytophthora* compelled the organizers of **The International Rhododendron Conference** in Scotland this last May to change the programme and substitute a talk by Ian Wright from the National Trust, an expert on this disease. His presentation was excellent and I invited him to the west coast to give the lecture in four locations, Nanaimo, Victoria, Langley and Vancouver. The cost was mainly covered by generous donations from The **British Columbia Landscape and Nursery Association**, **Mount Arrowsmith Rhododendron Society**, **Cowichan Valley Rhododendron Society**, **Victoria Rhododendron Society, Victoria Horticultural Society** and the **Central Vancouver Island Botanic Garden Society**. I thank them all for their generous contributions. Additional support came from the BCLNA in the form of marketing material and organizational help.

Accompanying each talk was a presentation covering the work of the BCLNA and the federal and provincial governments on this disease.

It was unfortunate that very few people attended these talks despite the wide publicity. This appeared to result from a general denial that the disease was present locally [it is and is causing economic losses!] or, if it was present, it would not affect rhododendrons in our gardens. This attitude might well be our downfall. Our climate is ideally suited to the spread of the disease that is capable of eliminating all the rhododendrons in an individual west coast garden if in gets a foothold. It can also infect nearly 150 other genera and species of garden plants. In conversation, Ian Wright mentioned that repairing the damage in one garden cost about $2 million and that many nurseries in the UK have suffered significant financial losses which have the potential to lead to closure in the worst cases, to date no compensation is on offer to mitigate any loses.

Knowledge of the threat is the best defense. The BCLNA has prepared an effective barrier to infection from its members' nurseries but each gardener should also recognize that they have a responsibility to keep the disease out of our gardens. The following article by Ian Wright summarizes his talk and should be read by all rhododendron growers.

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The Cowichan Valley Rhododendron Society

A Chapter of the American Rhododendron Society

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Phytophthora ramorum & kernoviae (Sudden Oak Death)

A Global Problem.

Ian Wright [1],
Garden Adviser,
The National Trust [2] in Devon & Cornwall.

Phytophthora ramorum was first discovered along the west coast of the USA in the 1990's (originally drought was blamed for large scale tree mortality) where a close relation of our own UK, *Phytophthora ramorum*, had and is still devastating the American Tan Oak population along with many other species.

The disease was first noted in the UK in 2003, it was initially picked up mainly on Viburnums and Rhododendrons then while testing for *Phytophthora ramorum* in Cornwall a new more aggressive pathogen was identified. (Subsequently named as *Phytophthora kernoviae*).

The initial worry was, and indeed still is, the risk of spread and consequent damage to our native plant communities and woodlands. Recent outbreaks of the diseases on a UK heathland native species *Vaccinium myrtillus* (UK Bilberry) has highlighted the concern. However the main damage at present is being caused to historic plant collections.

What is *Phytophthora ramorum*.

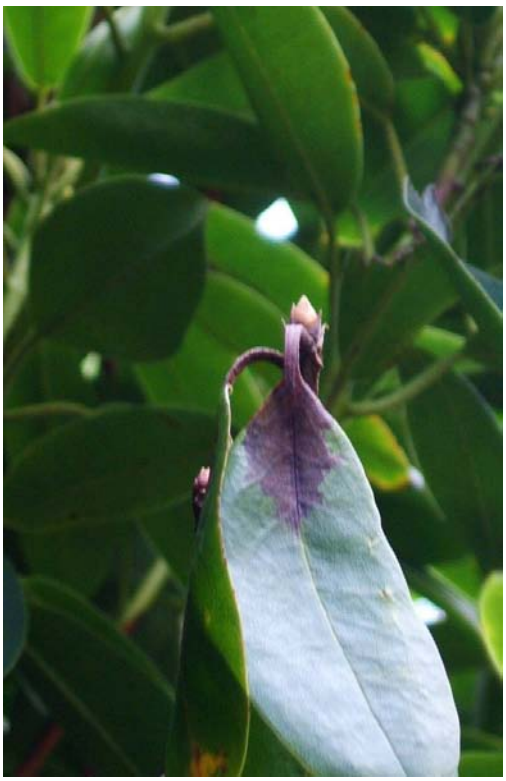
Phytophthora is a fungus-like disease pathogen, it belongs to a group of organisms known as oomycetes. Oomycetes were thought until recently to be fungi as they spore and have hyphae. DNA analysis in the 1990's indicated that they were more closely related to the algae groups (diatoms and brown algae in particular). They have been placed in a separate taxonomic kingdom part of the algae community 'Chromista', as opposed to a fungi kingdom member. Therefore Phytophthora ramorum is 'fungal like'.

Phytophthora ramorum spores are aerial dispersed within water particles. Although both *P.ramorum* and *P.kernoviae* are primary pathogens another effect of a high inoculum levels is the loss of beneficial microrhyzal fungi and or other infections such as Honey Fungus may well be more damaging on weakened plants. A main sporulating host occurs in both the UK and USA in large numbers *Rhododendron ponticum* and Californian Bay Laurel respectably. Reducing the main host and its hugh bio mass could help reduce risk and increased outbreaks.

The Main Hosts in the UK

- *Rhododendron sp*
- *Viburnum sp*
- *Magnolia sp*
- *Michelia sp*
- *Osmanthus sp*
- *Camellia sp*
- *Kalmia sp*
- *Pieris sp*

[1] and [2] - see page 6.



Typical Symptoms

Phytophthora ramorum on *Rhododendron*

Wilt and other fungal like symptoms on the lower areas of the plant, where the atmosphere is moist with less air movement.

The impact in ornamental gardens.

The two Phytophthora's, *ramorum* and *kernoviae* are both introduced pathogens to the UK from an as yet unexplored ecosystem. (expeditions to China and Assam as yet have not yielded any positive results to where these pathogens reside naturally) Both pathogens are increasingly having a major impact on UK gardens particularly in but not confined to the wetter west of the country. A large number of gardens have had outbreaks within the National Trust. All predictions are, if unchecked the pathogens will increase within gardens (all UK gardens within 20 years) and susceptible woodland or native plant communities spreading to all parts of the UK with similar climatic conditions conducive for the disease. We should not forget the first cases within National Trust gardens were as recent as 2003 maybe an indication of the aggressive nature of the disease. The susceptibility list of species continues to grow therefore making it likely some gardens will lose there historic character. Unwanted views, loss of green screens, loss of shelter and microclimate loss are all outcomes of infection.

Containment notices from th British Department of Environment, Food and Rural Affairs state that no susceptible species can be planted within a 4 metre radius of an infected plant for 3 years.

Within the National Trust there are over 500 confirmed outbreaks within 17 gardens in 6 regions. The actual figure may be considerably higher. A number of gardens are losing their Rhododendron collections (Rhododendron's being highly susceptible) at an alarmingly fast rate, along with many other woody species. UK wide mapping of risk areas using temperature, rainfall, susceptible species clearly show large parts of the western UK and some parts of the midlands and southern England in high risk situations. But the movement of plants within the nursery trade is one of the main known causes of spread.

Phytophthora ramorum in Europe

16 countries in the EU have reported the disease. Considerable research work is underway in Germany and Belgium. An outbreak on Rhododendron has been identified outside of the Nursery industry in Holland.

UK Forestry

Quercus robur is less likely to be infected but tests prove it can be colonised, but it did not produce lesions. Beech, Oak and Acer logs have been laid in high infection areas of the UK and it was found Beech will infect easily and within 10wks, less so Quercus, with no Acer infection using this method. It is generally thought thin barked trees in contact with infected Rhododendron are more likely to become infected. Bark infection can not produce zoospores but can produce the survival spores known as chlamydospores. Unlike the USA the UK has not had significant losses of mature trees,yet!

Disease pathways

One main source of long distance disease spread is from the 'pathways' created by moving nursery stock. Until 2004 notable finds of the disease in the nursery industry had gone undetected. The present situation is:
Phytophthora ramorum
828 (714 sites)
551 Eradicated
277 Ongoing
Phytophthora kernoviae
58
4 Eradicated
54 Ongoing
Although painful financially the disease is easier to contain within a nursery situation.

Causes of action to lessen risk!

One main path for long distance disease spread is through the movement of contaminated plant material'

- Set up a Quarantine area for incoming plants.
- Get to know the source nursery.
- Monitor any incoming plants health for at least a month.
- Limit access, designate separate tools, restrict water run off, exclude animals and birds.
- Plan ahead when buying to plant.

'Another main pathway for long distance disease spread is via soil carried on footwear, vehicles, machinery or animals'

The Impact of Infection

Loss of shelter: microclimate loss

Unwanted views: loss of green screens

Restricted Planting: what to plant as no susceptible species can be planted within 4 metres for 3 years

At infected sites:

- Wash and disinfect, boots etc.
- Advise garden staff to leave work footwear at the garden when leaving the site if possible.
- Liaise with people that go 'off track' such as shooting parties, advising of the risk posed of spreading spores.
- Restrict animal and people access away from any infected areas. Dogs on short leads, people to paths etc.

Good News!

Before and after shots of Arlington Court to demonstrate that a *Phytophthora ramorum* outbreak is not the end of the world!

'Good hygiene is a key way to effective disease control'

- Clean all tools at the end of an operation or moving from area to area.
- Wash then disinfect.
- Make all staff, volunteers and contractors aware of their responsibility of hygiene on site.
- Restrict run off after washing tools.
- Separate tools for clean and infected areas.

'Care when watering can reduce the risk of introducing disease'

- Recycled water or rainwater taken from infected sites can pose a risk.
- Ensure plants are not standing in water.
- Use overhead irrigation in a controlled measured way.
- Check hose pipes for leaks regularly.

Some Final thoughts!

Other factors to consider before major clearance
Bats: Frequently navigate between large mature plantings, to and from feeding grounds.
Habitat / Nesting Birds etc: Disturbance and change to local environmental conditions.
Archaeology: Removal may disturb valuable archaeological remains.

Fungicide: Agrifos/pentrebark may be a future answer to protecting our more valuable specimens, but a treatment program will need to be implemented which may last indefinitely.

Micropropagation

Micro prop, provides one answer to protecting valuable ageing specimens:

- Older, less vigorous specimens are notoriously difficult to 'prop' using traditional methods.
- Micro-prop ensures a clean / vigorous product that can be grown on at unaffected sites.

'In most cases, incoming plants will be the likely cause of a new outbreak outside of known disease hotspots'

Know the major host and reduce its mass. In the case of the UK Rhododendron ponticum

- Create a Quarantine area.
- Stay vigilant, review your garden hygiene operations and keep up to date with new guidance.
- Identify and record your most important plants then propagate / safeguard rare plants.
- Review and improve plant husbandry as necessary.
- Adequate resources for stringent inspection of plants coming into the country.

The need our protect our heritage.

Rhododendron macabeanum
AM 1937 FCC 1938

Flowered at Trengwainton for the first time in the UK. Material from Kingdon Ward expedition to Assam in 1927. Propogated material from Trengwainton plants 2007 flora bud response.

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The National Trust will also be lobbying the UK government agencies for:

- Adequate funding to continue research into the distribution, management and genetic makeup of the two plant diseases.

- Increased funding for the clearance of infected and non infected Rhododendron ponticum (major host and invasive species) throughout the UK.

- The formation of an Industry Working Party for Botanic and Heritage Gardens to discuss Phytophthora and other issues.

It's thought that around 90% of Fungi are yet to be discovered.
(One estimate is that we only have discovered 10% of fungi worldwide)
About 100 Phytophthora's are known, up to about 500 are believed not known, and of theses 20-30 may be significant aggressors!

Further information is available on the following sites.

Defra : Plant Health
http://www.defra.gov.uk/planth/pramorum.htm
Forestry Commission
http://www.forestry.gov.uk/forestry/WCAS-4Z5JLL
More info on the EU Habitats directive
http://www.forestry.gov.uk/england-protectedspecies#5
California Oak Mortality, Task Force
http://nature.berkeley.edu/comtf/

THE NATIONAL TRUST

A charity formed in 1895 to preserve places of historic significance and natural beauty for ever for everyone

The National Trust manages over 220 historic gardens in the UK
The largest collection under one ownership in the world!

The gardens range from the 14th century to the 20th century - 700 years of plant collecting and breeding.
The National Trust manages some internationally renowned gardens such as Hidcote, Bodnant, Stourhead, Powis and Sheffield Park.

300 Historic Houses
704 Miles of Coastline.
3.5 Million members.
13 Million visits to Houses and gardens annually.
4,000 Staff
39,000 Volunteers

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June 2006-to Date
Regional Garden Support and Adviser- The National Trust (Devon & Cornwall)
Chairman of Cornwall Phytophthora Working Group.
National lead on Phytopthora ramorum for The National Trust

June 2000 – 2006
Head Gardener - The National Trust, Trengwainton Garden, Cornwall.

1987 – June 2000
Head Gardener – The National Trust, The Vyne, Hampshire.

1983 - 1987
Full time Gardener, Tresco Abbey Garden, Isles of Scilly

1981- 1983
Royal Horticultural Society Garden, Wisley.