

Phytophthora ramorum

Werres, De Cock & Man in't Veld sp. nov.

Plant Pest Information Note

What is it?

Phytophthora ramorum is a fungus-like organism which is the casual agent of the disease commonly known in the USA as Sudden Oak Death or as Ramorum Disease in the UK. It has killed large numbers of trees on the Eastern seaboard of the USA in California and Oregon. It was first discovered there in 1995 and identified as a new species in 2000. It was first found in the UK in 2002 and in Ireland in 2003. It is a serious disease of a large number of trees, shrubs and other plants. As it is a relatively new disease, our knowledge of it is constantly being updated. Therefore the list of plants that are found to be



Leaf Blight on Camellia

susceptible to it is continuously increasing. Consequently any plant showing symptoms of it should be treated as suspicious; however, this can only be confirmed by laboratory analysis. There are several findings of the disease in Ireland each year in nurseries and garden centres, which are quickly eradicated. Most recently it has been found to have infected Japanese Larch, Noble Fir and a small Sitka Spruce in Forestry plantings. Information on this outbreak is available [here](#). The European Commission has introduced [emergency legislation](#) in an attempt to eradicate this disease and a recent [EFSA opinion](#) confirms that it is a serious threat.

It causes similar damage to a related disease known as [Phytophthora kernoviae](#), which has no common name. Laboratory diagnosis is required to confirm either.

Why should we be worried about it?

Rhododendron ponticum is considered an invasive plant in Ireland and is widespread throughout the countryside and in our forests. It is considered an intermediary host for this disease, which means that while it is not killed by it, it is a host that produces many spores, which may infect other nearby trees. Any plants that are infected by *P. ramorum* may be killed by it, but in the meantime might be helping its spread by producing spores. It has recently been discovered that Japanese Larch produces many more spores than *Rhododendron ponticum*.

As a lot of the hosts of this disease are found in the wider environment in Ireland, it is something that we should be very concerned about. It would have very serious environmental, economical and social consequences if it were to become established here. The loss of these host plants from an area would alter its natural biodiversity, which could have negative knock-on effects for other plant and animal species living there. It may have massive negative connotations in forestry settings were they to become infected.



The picture on the right shows an infected *Rhododendron* leaf showing necrosis of midrib.

What are its hosts?

The host range of this organism is extremely wide and new hosts are being confirmed for it on an on-going basis. A list of currently known hosts can be found on the last page of this information note. However some common ones include.

<u>Botanical Name</u>	<u>Common Name</u>	<u>Botanical Name</u>	<u>Common Name</u>
<i>Acer pseudoplatanus</i>	Sycamore	<i>Photinia x fraseri</i>	Photinia
<i>Aesculus hippocastanum</i>	Horse Chestnut	<i>Pieris</i> spp.	Pieris
<i>Calluna vulgaris</i>	Heather	<i>Prunus laurocerasus</i>	Cherry Laurel
<i>Camellia</i> spp.	Camellias	<i>Prunus lusitanica</i>	Portuguese Laurel
<i>Castanea sativa</i>	Sweet Chestnut	<i>Pseudotsuga menziesii</i>	Douglas Fir
<i>Fagus sylvatica</i>	Beech	<i>Quercus</i> spp.	Oaks
<i>Fraxinus excelsior</i>	Ash	<i>Rhododendron</i> spp.	Rhododendrons
<i>Griselinia littoralis</i>	Griselinia	<i>Rosa</i> spp.	Roses
<i>Ilex purpurea</i>	Holly	<i>Salix caprea</i>	Goat Willow
<i>Larix kaempferi</i>	Japanese Larch	<i>Syringa vulgaris</i>	Lilac
<i>Laurus nobilis</i>	Bay Laurel	<i>Taxus baccata</i>	Yew
<i>Magnolia</i> spp.	Magnolias	<i>Viburnum</i> spp.	Viburnums



What are its symptoms?

The symptoms of this disease vary from species to species and therefore can be difficult to accurately identify. They can include leaf necrosis, dieback on foliage and bleeding cankers on tree trunks. The most common sign of infection is a black or dark brown leaf tip or signs of necrosis at the junction of where the leaf attaches to the rest of the plant (petiole). As the spores can travel in raindrops blown by wind, this gives them access to new plants to infect. The picture opposite is a *Rhododendron* showing foliage dieback.

How does it spread?

In most cases where infected trees were found, infected Rhododendrons were in very close proximity indicating that they were the source of infection, most likely by infected laves rubbing up against the bark of the trees. However with the findings of infected Japanese Larch in the southwest of the UK and Ireland there were no Rhododendrons present indicating that the spores may have spread via air. The most efficient method of spreading this disease over long distances is by the movement of infected host plants, which may or may not display symptoms. In addition when rainfall lands on infected leaves that have produced spores, these spores will then be transported by this rainwater to new plants or to nearby streams and lakes. Rain in windy weather will transport these spores to other nearby hosts. The spores can stay alive in the soil and therefore it can spread on footwear from infected sites; therefore it is important that all boots etc are thoroughly cleaned after visiting infected areas.



Infected Southern red oak trunk showing bark cankers

Action in the event of suspect cases

Staff of the Horticulture and Plant Health Division and Forest Service of DAFM are regularly inspecting trees and shrubs in forests, nurseries, garden centres and public parks for any signs of this disease. If you see suspicious symptoms please contact your local plant health inspector or either of these Division Headquarters at the numbers below.

Horticulture and Plant Health Division,
Ground Floor, Block 1,
Department of Agriculture, Food and the Marine,
Backweston Campus, Young's Cross,
Celbridge, Co. Kildare
Phone: 01-5058885
Fax: 01-6275994
Email: plantandpests@agriculture.gov.ie

Or **Forest Service,**
DAFM,
Floor 3 West, Agriculture House,
Kildare Street, Dublin 2
Phone: 01-6072651
Fax: 01-6072545 I
If found in a Forest setting,

Further information and symptoms on this disease can be viewed on the website of the European and Mediterranean Plant Protection Organization (EPPO) by clicking on the links below. All Photographs are courtesy of EPPO.

[Phytophthora ramorum Information](#)

[P. ramorum Photographs](#)

Host plants of *Phytophthora ramorum* (Current List)

<u>Botanical Name</u>	<u>Common Name (If any)</u>	<u>Botanical Name</u>	<u>Common Name (If any)</u>
<i>Abies concolor</i>	White Fir	<i>Ilex latifolia</i>	Tarajo holly
<i>Abies grandis</i>	Grand Fir	<i>Ilex purpurea</i>	European Holly
<i>Abies procera</i>	Noble Fir	<i>Illicium parviflorum</i>	Yellow Anise
<i>Abies magnifica</i>	Red Fir	<i>Kalmia angustifolia</i>	Sheep Laurel
<i>Acer circinatum</i>	Vine Maple	<i>Kalmia latifolia</i>	Mountain Laurel
<i>Acer davidii</i>	Striped Bark Maple	<i>Larix kaempferi</i>	Japanese Larch
<i>Acer laevigatum</i>	Evergreen Maple	<i>Larix decidua</i>	European Larch
<i>Acer macrophyllum</i>	Big leaf Maple	<i>Laurus nobilis</i>	Bay Laurel
<i>Acer pseudoplatanus</i>	Sycamore	<i>Leucothoe axillaris</i>	Ferret-Bush, Dog Hobble
<i>Adiantum aleuticum</i>	Western Maidenhair Fern	<i>Leucothoe fontanesiana</i>	Drooping Leucothoe
<i>Adiantum jordanii</i>	California Maidenhair Fern	<i>Lithocarpus densiflorus</i>	Tanoak
<i>Aesculus californica</i>	California Buckeye	<i>Lithocarpus glabra</i>	
<i>Aesculus hippocastanum</i>	Horse Chestnut	<i>Lonicera hispidula</i>	Californian Honeysuckle
<i>Arbutus menziesii</i>	Pacific Madrone	<i>Loropetalum chinense</i>	Loropetalum
<i>Arbutus unedo</i>	Strawberry Tree	<i>Magnolia</i> spp.	Magnolias
<i>Arctostaphylos columbiana</i>	Hairy Manzanita	<i>Mahonia aquifolium</i>	Holly Leaved Barberry
<i>Arctostaphylos manzanita</i>	Manzanita	<i>Mahonia nervosa</i>	Creeping Oregon Grape
<i>Arctostaphylos uva-ursi</i>	Kinnikinnik, Bearberry	<i>Maianthemum racemosum</i>	False Solomon's Seal
<i>Ardisia japonica</i>	Japanese Ardisia, Maleberry	<i>Manglietia insignis</i>	Red Lotus Tree
<i>Betula pendula</i>	Silver Birch	<i>Molinadendron sinaloense</i>	
<i>Calluna vulgaris</i>	Heather	<i>Michelia</i> spp.	Michelias
<i>Calycanthus occidentalis</i>	Spicebush, Western Sweetshrub	<i>Nerium oleander</i>	Oleander
<i>Camellia</i> spp.	Camellia	<i>Nothofagus obliqua</i>	Roble Beech
<i>Castanea sativa</i>	Spanish/Sweet Chestnut	<i>Osmanthus</i> spp.	Osmanthus
<i>Castanopsis orthacantha</i>		<i>Osmorhiza berteroi</i>	Sweet Cicely
<i>Ceanothus thyrsiflorus</i>	Blue Blossom, Californian Lilac	<i>Parakmeria lotungensis</i>	Eastern Joy Lotus Tree
<i>Cercis chinensis</i>	Redbud	<i>Parrotia persica</i>	Ironwood
<i>Chamaecyparis lawsoniana</i>	Lawson's Cypress	<i>Photinia x fraseri</i>	Fraser Photinia
<i>Choisya ternata</i>	Mexican Orange	<i>Physocarpus opulifolius</i>	Ninebark
<i>Cinnamomum camphora</i>	Camphor Tree	<i>Picea sitchensis</i>	Sitka Spruce
<i>Clintonia andrewsiana</i>		<i>Pieris</i> spp.	Pieris
<i>Cornus capitata</i>	Bentham's Dogwood	<i>Pittosporum undulatum</i>	Victorian Box
<i>Cornus kousa</i>		<i>Prunus laurocerasus</i>	Laurel
<i>Corylopsis spicata</i>	Spike Winter hazel	<i>Prunus lusitanica</i>	Portuguese/Cherry Laurel
<i>Corylus cornuta</i>	California Hazelnut	<i>Pseudotsuga menziesii</i>	Douglas Fir
<i>Cotoneaster</i> sp.	Cotoneaster	<i>Pyracantha koidzumii</i>	Formosa Firethorn
<i>Daphniphyllum glaucescens</i>		<i>Quercus</i> spp.	Oaks
<i>Distylium myricoides</i>	Myrtle-leaved Distylium	<i>Rhododendron</i> spp.	Rhododendrons
<i>Drimys winteri</i>	Winter's Bark	<i>Ribes laurifolium</i>	
<i>Dryopteris arguta</i>	Californian Wood fern	<i>Rosa</i> spp.	Roses
<i>Eucalyptus haemastoma</i>	Scribbly gum	<i>Rubus spectabilis</i>	Salmonberry
<i>Euonymus kiautschovicus</i>	Spreading Euonymus	<i>Salix caprea</i>	Goat Willow
<i>Fagus sylvatica</i>	Beech	<i>Sarcococca hookeriana</i>	Himalayan Sweet Box
<i>Frangula californica</i>	California Buckthorn	<i>Schima argentea</i>	
<i>Frangula purshiana</i>	Cascara	<i>Schima wallichii</i>	Chinese Guger Tree
<i>Fraxinus excelsior</i>	Ash	<i>Sequoia sempervirens</i>	Coast Redwood
<i>Fraxinus latifolia</i>	Oregon Ash	<i>Syringa vulgaris</i>	Lilac
<i>Garrya elliptica</i>	Silk Tassel Bush	<i>Taxus</i> spp.	Including Yews
<i>Gaultheria shallon</i>	Salal, Oregon Wintergreen	<i>Torreya californica</i>	California Nutmeg
<i>Gaultheria procumbens</i>	Wintergreen	<i>Toxicodendron diversilobum</i>	Pacific Poison Oak
<i>Griselinia littoralis</i>	Griselinia	<i>Trachelospermum jasminoides</i>	Star Jasmine
<i>Hamamelis mollis</i>	Chinese Witch Hazel	<i>Trientalis latifolia</i>	Western Starflower
<i>Hamamelis virginiana</i>	Virginian Witch Hazel	<i>Tsuga heterophylla</i>	Western Hemlock
<i>Hamamelis x intermedia</i>	Hybrid Witch Hazel	<i>Umbellularia californica</i>	Californian Bay laurel
<i>Heteromeles arbutifolia</i>	Toyon	<i>Vaccinium</i> spp.	
<i>Hydrangea seemanni</i>	Hydrangea	<i>Vancouveria planipetala</i>	Redwood Ivy
<i>Ilex aquifolium</i>	Oriental Holly	<i>Veronica spicata</i>	Spike Speedwell
<i>Ilex cornuta</i>	Chinese Holly	<i>Viburnum</i> spp.	Viburnums