

Field Identification Guide

Phytophthora lateralis



Photograph: Ian Murgatroyd, Forestry Commission

Phytophthora lateralis

Phytophthora lateralis is an aggressive fungus-like pathogen that causes extensive damage mainly to Lawson cypress trees (*Chamaecyparis lawsoniana*). Lawson cypress and its numerous colourful varieties are frequently planted for amenity, and are among the most important conifers in the UK ornamental plant trade. The pathogen primarily attacks the roots of its hosts, and forms lesions which extend up into the root collar and stem base. The disease is nearly always fatal and can have a major impact on trees in woodlands, windbreaks, parkland, private gardens and nurseries.

Species affected	Lawson cypress (<i>Chamaecyparis lawsoniana</i>) is the main host in the UK, but infections on western red-cedar (<i>Thuja plicata</i>), northern white-cedar (<i>Thuja occidentalis</i>), Sawara cypress (<i>Chamaecyparis pisifera</i>), Pacific yew (<i>Taxus brevifolia</i>) and juniper (<i>Juniperus communis</i>) have also occasionally been reported. Alaskan cedar (<i>Cupressus nootkatensis</i>) and Douglas fir (<i>Pseudotsuga menziesii</i>) are susceptible to this disease under experimental conditions, which means that they may eventually become future hosts in the wider environment.
Signs and symptoms	The main symptom of this disease is the discoloration and death of the foliage in infected hosts. Foliage is affected uniformly following a root infection, or less commonly in discrete areas associated with infections on the stem or individual branches. The pathogen produces lesions in the living bark layers of the tree, which eventually girdle stems and branches and deprive the host of water and nutrients. The foliage of infected hosts will initially turn a slightly lighter green colour than healthy counterparts, followed by a reddish brown/bronze colour as it dies. The colour change from light green to brown can occur rapidly. The lesions produced by this disease are tongue or flame-shaped with a sharp demarcation between the diseased tissue, which is a cinnamon brown colour, and healthy bark, which is creamy/pinky white. Lesions are not visible unless the bark is removed, although resin bleeds (resinosis) on the outer bark may indicate an underlying lesion. Similar disease symptoms on Lawson cypress can be caused

	by other <i>Phytophthora</i> species such as <i>P. cambivora</i> and <i>P. cinnamomi</i>. Other fungal pathogens including honey fungus (<i>Armillaria</i> spp.) and <i>Nectria cinnabarina</i> can produce similar symptoms to those of <i>P. lateralis</i> such as a general deterioration in crown condition and the death of foliage and branches. However, for an <i>Armillaria</i> infection, cutting away outer bark at the stem/root collar should reveal the presence of white mycelial sheets located between the inner bark (phloem) and the outer bark, whereas a <i>P. lateralis</i> infection will produce cinnamon-brown, tongue-shaped lesions. The fungus <i>Amylostereum laevigatum</i>, which produces sunken, elongated canker rots on the bark of Lawson cypress trees, leading to discoloration of foliage and the death of branches, can also be mistaken for <i>P. lateralis</i>. Infestation by insects such as scale insects (e.g. <i>Carulaspis</i> spp.), weevils such as the clay coloured weevil (<i>Otiorynchus singularis</i>), moth larvae such as the cypress tip moth (<i>Argyresthia cupressella</i>) and aphids such as the cypress aphid (<i>Cinara cupressi</i>) also results in the death of foliage and branches in Lawson cypress trees. In addition, abiotic factors such as waterlogging, drought and snow damage can result in browning and death in the crowns of Lawson cypress trees. Magnesium deficiency also causes foliage discoloration.
Timing	Bark lesions and associated discoloured and dead foliage of infected hosts are visible all year round.
Biosecurity	<i>P. lateralis</i> is waterborne and can also spread via movement of plant debris and in soil adhering to footwear, dogs' paws, bicycle and vehicle wheels, tools and equipment. Transportation and movement of infected plants and soil is also a key means of long-distance spread. Precautions such as cleaning and disinfecting footwear and tools before and after a site visit are strongly advised in outbreak areas to prevent further spread. Keep vehicles on hard tracks and ensure that they are kept clean so that they are easier to disinfect when necessary and check them over for any plant material/soil before leaving an infected site.

Reporting requirements	If you find this disease, please report it through Tree Alert (https://treealert.forestresearch.gov.uk). In Northern Ireland please report via the TreeCheck website (www.treecheck.net) or phone app, or by emailing planthealth@daera-ni.gov.uk For traded plants and any non-tree hosts please email planthealth.info@apha.gov.uk (England & Wales), or hort.marketing@gov.scot (Scotland).
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Based on information available in October 2017.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Lawson cypress trees infected by *Phytophthora lateralis*. In the ellipse the foliage is a slightly lighter green colour than that of healthy tissue. The arrow shows the crown of another tree which has been killed by the pathogen.

Signs and symptoms



Photograph: Barnaby Wyder, Forestry Commission England Tree Health Team

Lawson cypress trees at different stages of infection by *Phytophthora lateralis*.

Signs and symptoms



Photograph: Joan Webber, Forest Research

Lawson cypress killed by a *Phytophthora lateralis* root infection.

Signs and symptoms



Photograph: Ian Murgatroyd, Forestry Commission

Lawson cypress tree with aerial infections of *Phytophthora lateralis*.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Resinosis associated with underlying *Phytophthora lateralis* lesions on the stem of an infected Lawson cypress tree.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Resinosis associated with underlying *Phytophthora lateralis* lesions at the base of the stem of a Lawson cypress tree.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Bark lesion caused by *Phytophthora lateralis* on a stem of an infected Lawson cypress tree (outer bark has been removed).

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Bark lesion caused by *Phytophthora lateralis* (outer bark has been removed); note the sharp demarcation between healthy (pale cream) and unhealthy (brown) tissue.

Signs and symptoms



Photograph: Robert Strouts, Forestry Commission

Phytophthora lateralis lesion extending from the roots into the lower stem in an infected Lawson cypress tree.

Signs and symptoms



Photograph: Clive Brasier, Forest Research

Base of a Lawson cypress tree showing necrotic bark lesions resulting from root collar infection by *Phytophthora lateralis*.

Look-alike signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Foliar symptoms of Lawson cypress trees with roots infected by honey fungus (*Armillaria* spp.).

Look-alike signs and symptoms



Photograph: Forest Research

Lawson cypress hedge trees that are infected with honey fungus.

Look-alike signs and symptoms



Photograph: Brian Greig, Forestry Commission

Lawson cypress hedge trees that are infected with honey fungus.

Look-alike signs and symptoms



Photograph: Robert Strouts , Forestry Commission

A Lawson cypress tree infected by the fungal pathogen *Nectria cinnabarina*. The upper part of the tree is dying as a result of a girdling stem canker (visible as a chestnut brown patch along the stem).

Look-alike signs and symptoms



Photograph: Robert Strouts, Forestry Commission

Scale insect (*Carulaspis* sp.) damage to a cultivar of Lawson cypress.

Look-alike signs and symptoms



Photograph: Tony Anderson, Forestry Commission

Weevil damage (*Otiorhynchus singularis*) to Lawson cypress foliage in naturally regenerated trees.

Look-alike signs and symptoms



Photograph: Tony Anderson, Forestry Commission

Feeding damage on the stem of a young Lawson cypress tree caused by adult weevils.

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Observatree aims to create a tree-health early-warning system using citizen science.

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This booklet forms part of a set that supports Observatree volunteers when out looking for priority pests and diseases. It supplements face-to-face training and is not intended as a full or detailed description. It will also be useful for others who have some knowledge of the particular pest or disease and understand how to look for these. Further information is available online from the websites listed below:

www.observatree.org.uk

www.forestresearch.gov.uk/tools_and_resources/fthr/pest-and-disease-resources/

www.gov.uk/guidance/prevent-the-introduction-and-spread-of-tree-pests-and-diseases

<https://planthealthportal.defra.gov.uk>