Department for Environment, Food & Rural Affairs

Plant Pest Factsheet

Root rot of *Chamaecyparis*

Phytophthora lateralis

Photo 1. Single infected mature Lawson's cypress tree © Forestry Commission

Background

Phytophthora lateralis is a fungus-like plant pathogen which causes an often-fatal disease of trees. It has been present in the USA from at least the 1920s. The first UK finding was in a country park in Scotland in 2010 and it has now been found scattered throughout Great Britain and Northern Ireland. Action is taken on infected traded plants, however, following a consultation process, no action is required for infected plants in the wider environment. Instead, advice is available to landowners on disease management.

Geographical Distribution

Phytophthora lateralis was first described infecting *Chamaecyparis lawsoniana* (Lawson's cypress) in Washington State, USA, in the 1920s on horticultural stock of unknown origin. In 1957 it was found on native Lawson's cypress in Oregon, then gradually extending throughout the state and establishing in California in the 1980s. It is now also present in Florida and Washington State, as well as British Columbia in Canada.

In East Asia, it has been detected in soil in forests of yellow cedar (*C. obtusa* var *formosana*) and on foliage of the same host in north-eastern Taiwan. It has also been found associated with fallen cedar foliage in forests of the southern islands of Japan. Evidence suggests *P. lateralis* is native to East Asia and causes little damage in native forests in this region.

In South America, it was detected in forest soils in Argentina in 2020 during a survey of *Phytophthora* species within Patagonian forests where Chilean cedar (*Austrocedrus chilensis*) is a common component, although *P. lateralis* was not observed infecting any specific hosts.

In Europe, it is established in France and the Netherlands on Lawson's cypress. In Czechia, *P. lateralis* was identified by DNA metabarcoding from nursery soil samples and filtered river water samples, although no symptomatic plants have been observed. There has also been one finding in the Republic of Ireland on Lawson's cypress.

In November 2010, scientists from Forest Research identified *P. lateralis* as present in mature (70-80 year-old) Lawson's cypress trees in Scotland. This was the first UK record of the pathogen. It has since been found in a limited distribution in England and Wales, and more extensively in Northern Ireland.

Host Plants

Lawson's cypress, also known as Port Orford Cedar in its native range in North America, is the primary and probably most susceptible host. Other species in the genus that can be infected are Taiwan cedar (*C. formosensis),* hinoki cypress (*C. obtusa*) and Sawara cypress (*C. pisifera)*. Pacific yew (*Taxus brevifolia*) is an occasional host in North America.

There have also been host records for western red cedar (*Thuja plicata*), white cedar (*Thuja occidentalis*), juniper (*Juniperus*), periwinkle (*Vinca*) and *Petunia.*

Experiments in the lab have shown Alaskan cedar (*Callitropsis nootkatensis*), Douglas fir (*Pseudotsuga menziesii*) and *Rhododendron* have some susceptibility but infections on these hosts have not been found in the wider environment or in trade.

Description

For the most susceptible host, Lawson's cypress, typically the parts of the tree that become infected are the roots and stem base, although the pathogen has occasionally been found to spread aerially and infect branches and foliage. Stem or collar lesions girdle the tree, interrupting the flow of nutrients, causing foliage to initially appear slightly lighter in colour than that of healthy trees, but it later withers, turns bronze/ red, and finally, light brown as the tree declines and dies. The root/collar lesions which extend up into the lower stem are described as 'tongue-like'. When these are exposed by removal of the outer bark the underlying phloem is necrotic, often cinnamon brown in colour, with a distinct margin between diseased and healthy tissue. Occasionally resinous bleeds can appear from the lesions.

Aerial infections are uncommon, but can show as dead branches with small cankers occurring in the middle to lower part of the canopy. These can occur with or without associated basal stem lesions.

Disease symptoms caused by *P. lateralis* can be confused with other infections such as those caused by *P. cinnamomi*, a pathogen which is already present on a range of hosts in the UK and around the world and which was also detected at the first affected site in Scotland. This species of *Phytophthora* is known to be damaging to Lawson's cypress. Physical damage caused by heavy snow or drought may also result in browning of the foliage but there will be no associated lesions.

Photo 2: Young Lawson's cypress killed by *Phytophthora lateralis* infection. Source: Richard Sniezko, August 2005.

Photo 3: Mature Lawson's cypress killed by *Phytophthora lateralis* infection. Source: Richard Sniezko, June 2003.

Photo 4: Dead outer branch of Lawson's cypress infected with *Phytophthora lateralis*. Source: Richard Sniezko, June 2003.

Biology

Like other species of *Phytophthora, P. lateralis* produces infective spores known as zoospores which are contained in sporangia. The zoospores are released from sporangia in moist soil and swim through the surface water around soil particles until they encounter root tips, where they enter the plant. Following infection of the fine roots, the pathogen advances into the major roots and root collar, extending into the lower stem, creating lesions that can girdle the tree. Zoospores can also move in watercourses, facilitating further spread. *Phytophthora lateralis* also produces long-lived resting spores known as chlamydospores which, if moved in soil, can allow pathogen to spread over longer distances, and may also be present in soil/soil-based growing media associated with non-host plants. Temperatures of between 3-25°C are required for mycelium growth, but it can survive higher and lower temperatures for at least 16 weeks. Four clonal lineages are currently known - two from Taiwan, one from the USA (which is the most widespread) and one from the UK.

Dispersal and Detection

The pathogen could continue to enter the UK and may spread in the nursery trade through movement of infected host plants, contaminated growing media associated with non-host plants, or as a soil/water contaminant.

Should *P. lateralis* spread further into the wider environment it is likely to cause tree death amongst plantings of Lawson's cypress, infect other *Chamaecyparis* species and maybe other species of trees and shrubs. Lawson's cypress planted near infected watercourses can be particularly vulnerable. Aerial spread is also a possible route of movement of the pathogen in the local area, through wind-blown rain or mist.

Aside from flood events, the disease spreads slowly and therefore most new infections occur due to it being introduced through trade, or infected soil on boots, machinery or equipment.

Economic Impact

When trees are infected, it is unlikely that they will recover and it usually results in the death of the tree. As Lawson's cypress is one of the most popular ornamental conifers in the UK, this pathogen poses a threat to the ornamental tree industry. It also threatens public parks and gardens, which would be impacted by having to remove and replace dead trees. Although there have only been a few examples of western red cedar infected by *P. lateralis*, this tree species is grown for timber production in the UK so the pathogen could also be a threat to forestry.

Pest Management and Reporting

Findings in the wider environment do not need to be reported. However, as it is difficult to eradicate *P. lateralis* from soils once present, it is best to prevent it from arriving in the first place. Consider isolating any new plants and check them for symptoms before planting out. Practise good biosecurity by regularly cleaning boots, machinery and equipment to prevent transfer of contaminated soil.

If you discover *P. lateralis,* felling is recommended. Destroy any infected material by either burning or chipping and burying and avoid moving this material off-site to prevent spreading the disease. Restrict footfall to the area to limit further spread within the site. For single trees in urban environments, careful consideration should be given to what species are replanted and how the infected land is managed.

Further guidance on management of the disease can be found from Forest Research at https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/phytophthora-lateralis/.

Suspected cases of *Phytophthora lateralis* in nurseries and garden centres should be reported to the relevant authority:

For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, York.

Tel: 0300 1000 313

Email: planthealth.info@apha.gov.uk

For **Scotland**, contact the **Scottish Government's Horticulture and Marketing Unit:**

Email: hort.marketing@gov.scot

For **Northern Ireland**, contact the **DAERA Plant Health Inspection Branch:**

Tel: 0300 200 7847 Email: planthealth@daera-ni.gov.uk

Web: https://www.daera-ni.gov.uk/topics/plant-and-tree-health

For additional information on UK Plant Health please see:

https://planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/

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

https://www.gov.uk/plant-health-controls

http://www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases

https://www.daera-ni.gov.uk

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