



# *Phytophthora pluvialis*



## Background

*Phytophthora pluvialis* is a recently described fungus-like pathogen damaging a range of trees including western hemlock, pines and Douglas fir. It was originally reported as causing damage on tanoaks and Douglas fir in Oregon, USA in 2013; but has also been confirmed in California and Washington. There have been further reports of the pathogen in New Zealand on pines and Douglas fir, where it causes a disease called 'red needle cast'. The pathogen was most recently found on western hemlock and Douglas fir trees initially in Cornwall, UK (but has since been found sporadically in GB, but not Northern Ireland) since 2021. The pathogen was first found in soil in Oregon in 2002 and scientifically named *P. pluvialis* in 2013. It was first discovered in New Zealand in 2008 and is considered to have been introduced from the USA.

## Symptoms

- The pathogen is known to cause premature needle drop (needle cast), shoot dieback and lesions on the stems, branches and roots (Figs 1a/b/c/d). On pines, only needle cast has been observed and symptoms are only commonly seen on *Pinus radiata*.
- Branch and stem cankers may exude copious amounts of resin and often have a blackened and cracked surface (Figs 2a/b/c/d). It may damage both young trees, including regeneration growth in forest, as well as mature trees and symptoms frequently develop on lower branches first.
- Infected trees may show needle browning/ chlorosis (Figs 3a/b/c)

Figure 1. Dieback and needle cast in infected (a/b) Douglas fir and (c/d) western hemlock.



Figure 2. Resinous stem cankers in infected (a/b) Douglas fir and (c/d) western hemlock trees.



Figure 3. Needle browning in (a) Douglas fir and (b) western hemlock and (c) typical needle chlorosis in western hemlock.

