

Field Identification Guide

Chestnut blight



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight

Chestnut blight is a serious disease of chestnut trees caused by the fungal pathogen *Cryphonectria parasitica*. This disease infects healthy trees via bark cracks or wounds in woody tissue, such as those made from grafting, coppicing, or the activity of squirrels and some insects such as the oriental chestnut gall wasp (*Dryocosmus kuriphilus*) and wood borers. Once an infection has entered a susceptible host, it can spread so rapidly that stems or branches are soon girdled, and cankers, which form on main stems, can kill the entire above-ground part of a tree within one or two years. However, in some instances the fungus has been observed to be less aggressive and produce subtle symptoms (e.g. lesions that develop slowly and do not necessarily result in the death of tissues above them). *C. parasitica* causes significant disease and mortality in chestnut orchards, plantations and woodlands throughout many regions of Europe.

Species affected	<p>The main host for this disease in the UK is European chestnut (<i>Castanea sativa</i>), also commonly known as sweet chestnut, which is grown for forestry and amenity in the UK and nut production elsewhere in Europe. Introduced plantings of American chestnut species including <i>C. dentata</i> are also at risk. Both of these species are very susceptible to infection by chestnut blight and are usually killed by the disease. Oaks (<i>Quercus</i> species), including <i>Q. petraea</i> and less often <i>Q. robur</i>, <i>Q. ilex</i> and <i>Q. pubescens</i>, can be infected, although the cankers tend to be superficial and only rarely cause the death of branches or trees. Other tree hosts such as hop-hornbeam (<i>Ostrya carpinifolia</i>) and Italian alder (<i>Alnus cordata</i>), some maple species such as <i>Acer rubrum</i>, European hornbeam (<i>Carpinus betulus</i>), some <i>Fagus</i> species, <i>Rhus typhina</i> and <i>Malus domestica</i> have also been reported as being hosts for this pathogen in Europe.</p> <p>Chestnut blight does not affect horse chestnut trees (<i>Aesculus hippocastanum</i>) or chestnut oaks (<i>Q. prinus</i>).</p>
Signs and symptoms	<p>Conspicuous and often numerous sunken, bright orange-brown cankers can occur on the bark of young branches of infected trees. On older bark, the cankers have a roughened surface but are less obvious because the discoloration is not so marked. Bark cracks and swelling, caused by the build-up of callus tissues below lesions, can occur when disease progression is slow. However, bark cracks do not tend to occur when the disease progression is rapid because the bark is killed before callus tissue has time to form. The cankers</p>

	<p>caused by chestnut blight can eventually girdle branches and stems, with all live tissue above the girdling canker dying. On grafted trees, infections are most frequently found in areas close to the graft where callusing occurs, whereas in orchard and coppiced trees infections usually occur at the base of the stem (collars or insertion points). The infection does not spread into the root system and all symptoms of this disease occur above ground.</p> <p>Masses of pin-head sized, yellow-orange to reddish-brown pustules may also be evident on infected bark. These fruiting bodies erupt through lenticels (gas exchange structures) in the bark and exude long, yellow-orange tendrils/threads of spores in humid and wet weather.</p> <p>Another obvious symptom of this disease is wilted and brown dying and dead leaves which are retained by the tree beyond a girdling canker. Below the canker, all tissues will be healthy and epicormic growth (prolific sprouting) may be visible.</p> <p>The formation of pale-brown mycelial fans in the inner bark is also characteristic of this disease. However, these fans can only be observed if the outer bark has been removed or has come away. Fallen branches with lesions and fruiting bodies may be present beneath mature trees infected with chestnut blight.</p> <p>Crown dieback is also a symptom of chestnut blight. However, this can also be caused by other pathogens such as <i>Phytophthora cinnamomi</i> or <i>P. cambivora</i> (which are commonly associated with 'ink disease', named after a blue-black stain found around damaged roots) and <i>P. ramorum</i>. Dieback and cankers on sweet chestnut are also occasionally caused by other fungal pathogens such as forms of <i>Amphiportha castanea</i>, <i>Diplodina castaneae</i> and <i>Gnomoniopsis smithogilvyi</i>. Coral spot caused by the fungus <i>Nectria cinnabarina</i> may also be confused with chestnut blight because of its small orange fruiting bodies. Squirrel damage can also cause dieback in the crown of sweet chestnut trees.</p>
Timing	<p>Late summer or autumn is the best time to see fresh wilting of the leaves. Typically the leaves on branches killed by the blight are retained by the tree and can still be seen even</p>

	<p>after the normal autumnal leaf drop. Dieback is easier to recognise when the tree is in leaf. The fruiting bodies can be seen throughout the year but are more common when the weather is wet or humidity levels are high.</p> <p>Cankers and bark cracks are present on infected trees throughout the whole year but they may be easier to see during the winter when the trees have lost their leaves.</p>
Biosecurity	<p>This fungus is a wound pathogen that enters healthy tissue via pruning and any other activity causing the bark of the tree to become damaged (e.g. squirrel activity). For this reason, it is important to fully disinfect pruning/sampling tools before and after contact with each tree. The mycelium of the pathogen produced in infected bark is thought to persist for up to ten months even when air dried. There is also a small risk of disease transmission via fruits or seeds. The pathogen may also exist saprotrophically (i.e. by living and feeding on dead organic matter) on broadleaved trees other than sweet chestnut, allowing it to persist even when infected chestnut trees have been removed. Therefore, it is imperative that all tree-derived debris is removed from clothing and that boots are washed clean of small pieces of wood and bark and are disinfected before leaving and arriving at a site. Keep vehicles on hard tracks and ensure that they are kept clean so that they are easier to disinfect when necessary. Wet and windy weather favours spread of this disease so pruning/sampling or other invasive contact should be restricted to periods of dry weather.</p>
Reporting requirements	<p>If you find this disease, please report it through Tree Alert (https://treealert.forestresearch.gov.uk).</p> <p>In Northern Ireland please report via the TreeCheck website (www.treecheck.net) or phone app, or by emailing planthealth@daera-ni.gov.uk</p> <p>For traded plants and any non-tree hosts please email planthealth.info@apha.gov.uk (England & Wales), or hort.marketing@gov.scot (Scotland).</p>

Based on information available in August 2017.

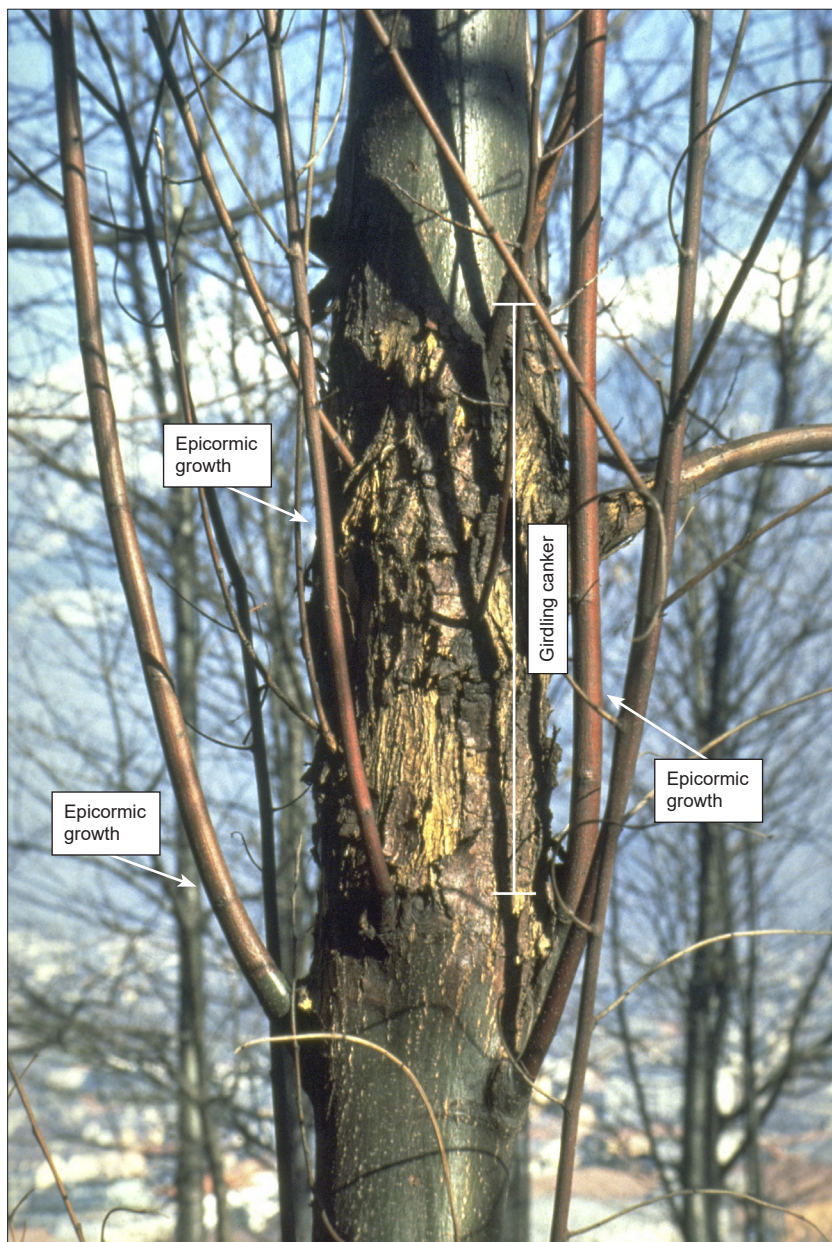
Signs and symptoms



Photograph: Forestry Commission England Tree Health team

Patches of dead retained leaves above a girdling chestnut blight canker.

Signs and symptoms



Photograph: courtesy of Dr. Daniel Rigling, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland. www.wsl.ch

Epicormic growth below a girdling canker of chestnut blight.

Signs and symptoms



Photograph: courtesy of Dr. Daniel Rigling, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland. www.wsl.ch

Chestnut blight canker on the stem of a sweet chestnut tree.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight canker on the stem of a sweet chestnut tree. Note the diseased bark is still fairly smooth but has longitudinal cracks.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight canker on the stem of a sweet chestnut tree. Note the longitudinal cracks on the cankered bark and epicormic growth below the canker.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight canker on the stem of a sweet chestnut tree. Note the ragged appearance of the cankered bark and presence of epicormic growth.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight canker on the stem of a sweet chestnut tree. Note the ragged appearance of the cankered bark and presence of epicormic growth.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight canker on the stem of a sweet chestnut tree.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight canker at the base of the stem of a sweet chestnut tree.

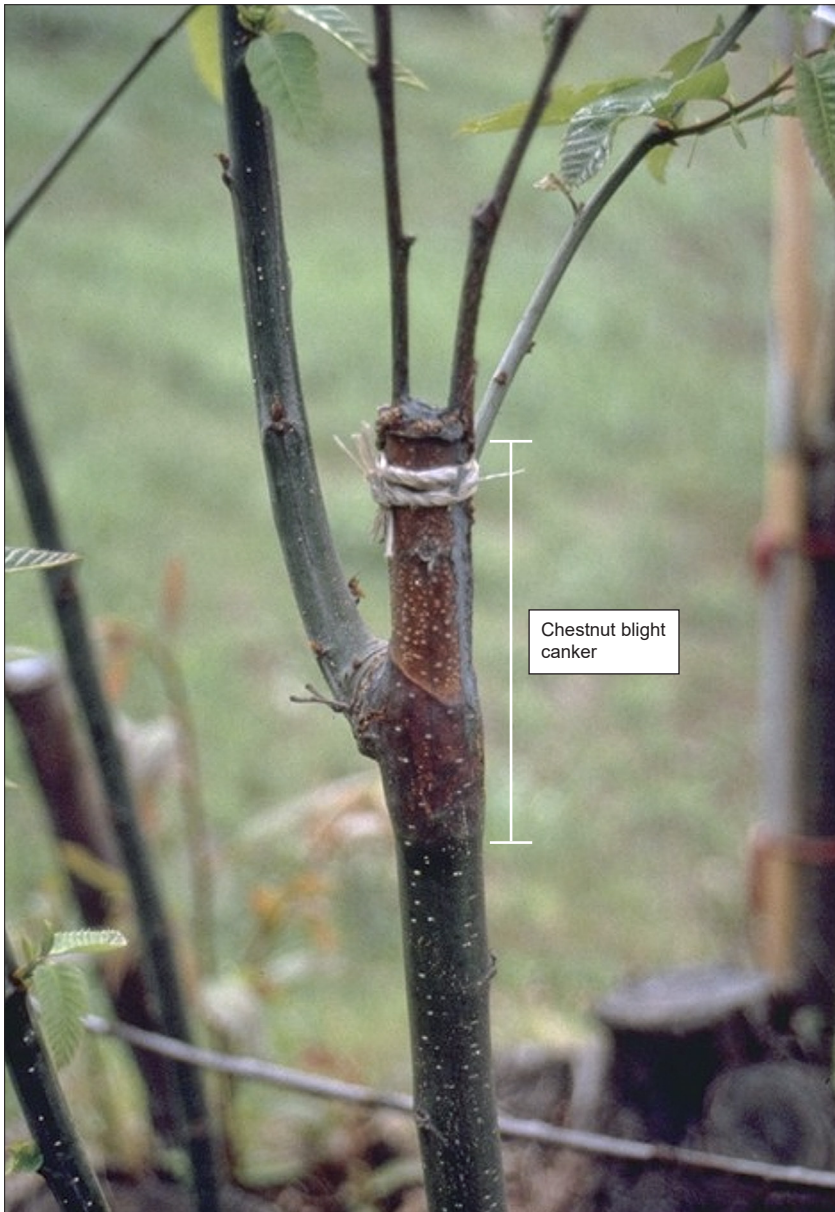
Signs and symptoms



Photograph: Barnaby Wylder, Forestry Commission England Tree Health team

Chestnut blight cankers and bark cracks at the base of a sweet chestnut tree.

Signs and symptoms



Photograph: courtesy of Dr Daniel Rigling, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland. www.wsl.ch

Chestnut blight canker on a young grafted tree resulting from infection entering through the grafting wound.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Chestnut blight lesion on a young branch.

Signs and symptoms



Photograph: courtesy of Dr Daniel Rigling, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland. www.wsl.ch

Bright orange-brown chestnut blight lesion on the young smooth bark of a sweet chestnut tree.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Orange coloured bark of a sweet chestnut tree infected with chestnut blight.

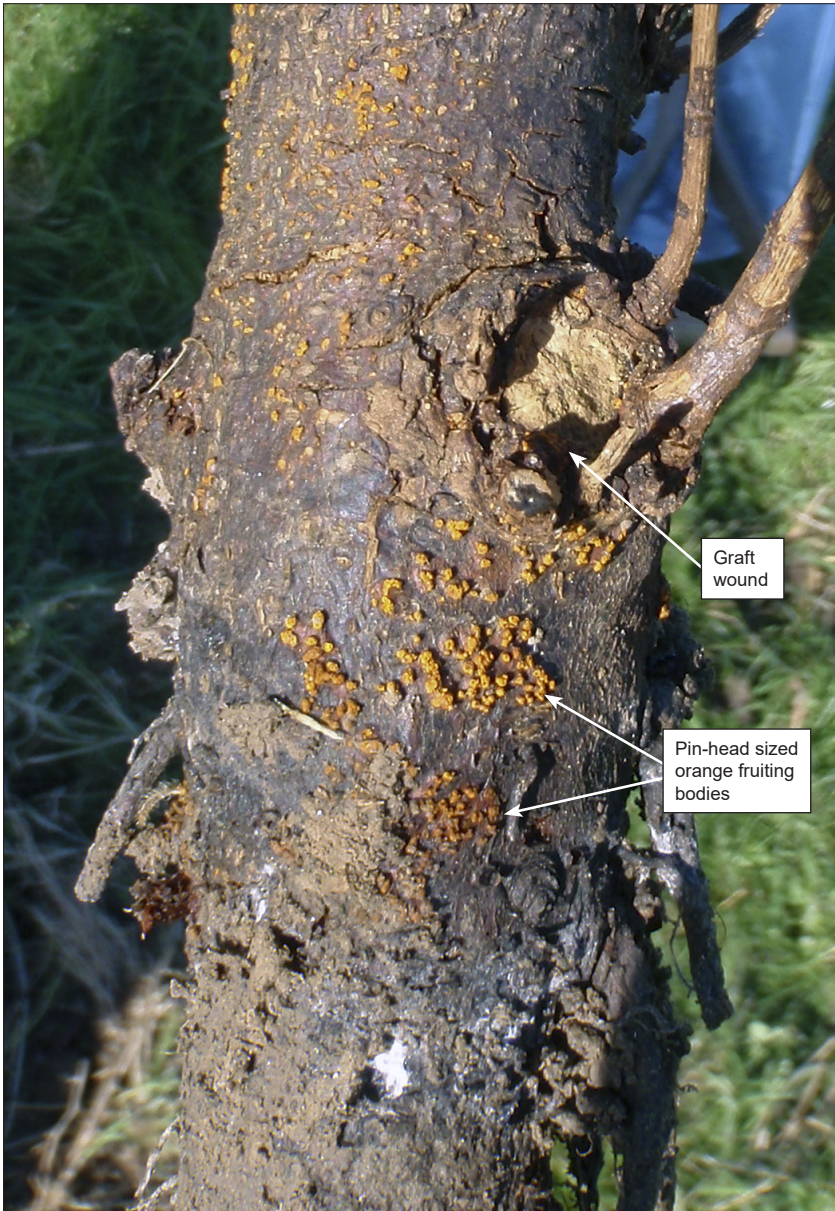
Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Fruiting bodies of *Cryphonectria parasitica* on a chestnut blight canker.

Signs and symptoms



Photograph: Barnaby Wylder, Forestry Commission England Tree Health team

Pin-head sized orange fruiting bodies (arrowed) occurring on chestnut blight cankers below a graft wound (arrowed) on a sweet chestnut stem.

Signs and symptoms



Photograph: Barnaby Wylder, Forestry Commission England Tree Health team

Squirrel damage can facilitate the entry of *Cryphonectria parasitica* to sweet chestnut trees.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Fruiting bodies of *Cryphonectria parasitica* on the surface of a chestnut blight canker.

Signs and symptoms



Photograph: courtesy of Dr Daniel Rigling, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland. www.wsl.ch

Pin-head sized orange fruiting bodies within cracks on a sweet chestnut stem.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Fruiting bodies occurring on the bark of a sweet chestnut tree infected with chestnut blight.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Orange fruiting bodies on the surface of a sweet chestnut blight canker on a side branch.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Orange fruiting bodies occurring in crevices and over the surface of a chestnut blight canker.

Signs and symptoms



Photograph: courtesy of Dr. Daniel Rigling, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland. www.wsl.ch

Yellow-orange tendrils of spores protruding from *Cryphonectria parasitica* fruiting bodies on the bark.

Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

Mycelial fans produced below the bark by *Cryphonectria parasitica*.

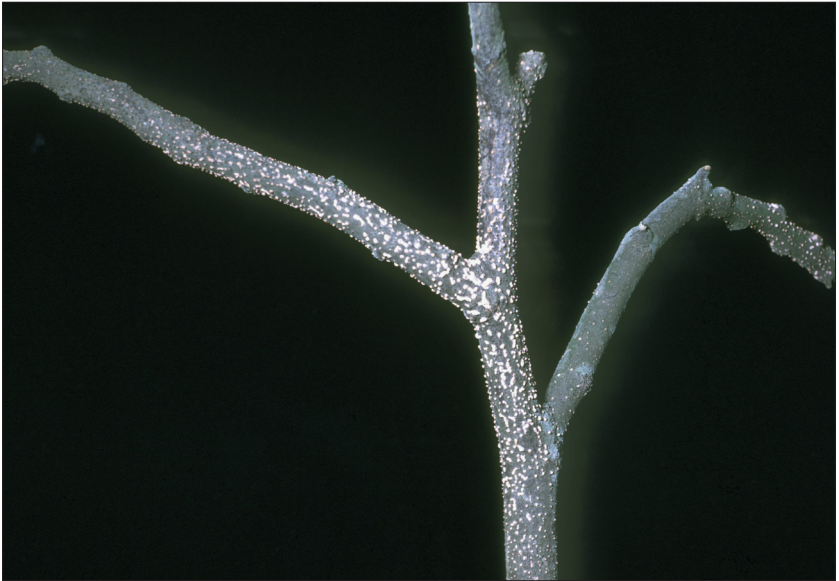
Signs and symptoms



Photograph: Ana Pérez-Sierra, Forest Research

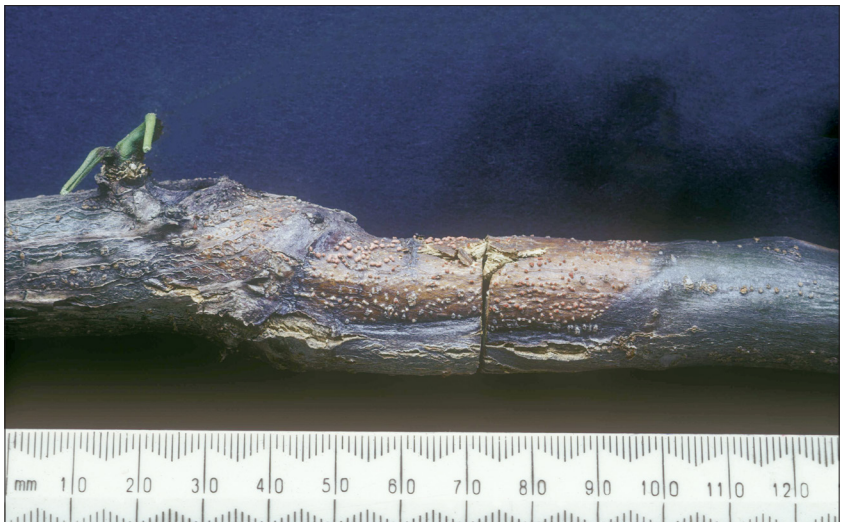
Mycelial fans produced below the bark by *Cryphonectria parasitica*.

Look-alike signs and symptoms



Photograph: Thelma Wood, Forest Research

Characteristic orange-yellow fruiting bodies of the coral spot fungus (*Nectria cinnabarina*) on the bark of an infected tree.



Photograph: Robert Strouts, Forest Research

Canker of the coral spot fungus (*Nectria cinnabarina*) on the bark of an infected tree.

Look-alike signs and symptoms



Photograph: George Gate, Forest Research

Fruiting bodies of the coral spot fungus (*Nectria cinnabarina*) on the bark of an infected tree.

Look-alike signs and symptoms



Photograph: Suzanne Sandis-Frey, Forest Research

Bark cankers on young sweet chestnut caused by the fungus *Amphiportha castanea*.

Look-alike signs and symptoms



Photograph: E B Marquis, Forest Research

Cankers and bark cracks on sweet chestnut bark caused by the fungus *Amphiportha castanea*.

Look-alike signs and symptoms



Photograph: E B Marquis, Forest Research

Cankers and fruiting bodies of the fungus *Amphiportha castanea* on sweet chestnut.

Look-alike signs and symptoms



Photograph: Forest Research

Cankers and bark cracks on sweet chestnut bark caused by the fungus *Gnomoniopsis smithogilvyi*.

Look-alike signs and symptoms



Photograph: Suzanne Sancisi-Frey, Forest Research

Lesion caused by *Phytophthora cinnamomi* at the base of a sweet chestnut tree stem.

Look-alike signs and symptoms



Photograph: Forestry Commission England Tree Health team

Dieback and leaf browning of sweet chestnut trees caused by *Phytophthora cinnamomi*.

Look-alike signs and symptoms



Photograph: Barnaby Wylder, Forestry Commission England Tree Health team

Leaf browning caused by *Phytophthora ramorum* on shoots of a sweet chestnut tree.

Look-alike signs and symptoms



Photograph: Forestry Commission England Tree Health team

Leaf infections caused by *Phytophthora ramorum* on shoots of a sweet chestnut tree.

© Crown copyright 2017.

Published by Forest Research as part of the Observatree project.

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

Observatree is a partnership project led by Forest Research, the research agency of the Forestry Commission. Project partners are the Animal & Plant Health Agency (APHA), Department for Environment, Food & Rural Affairs (Defra), Fera Science Ltd, the Forestry Commission, the National Trust, Scottish Forestry, the Welsh Government and the Woodland Trust. Supporting the project is Natural Resources Wales. The first four years of this project was 50% funded by the EU's LIFE programme.

Acknowledgements:

Dr Suzanne Sancisi-Frey, Forest Research, for compiling this guide based on a review of current literature and with technical contributions from experts across the Observatree partnership.

All those who have given permission for images to be used within the guide.

The Communications Team, Forest Research, for the original design and creation of the guide.

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>