

# Tree Pest and Disease Identification Guide

This guide can be used for the **OPAL Tree Health Survey**



## Oak

Our native oaks – known as English Oak (*Quercus robur*) and Sessile Oak (*Quercus petraea*) – are the most common broadleaved tree in the UK. Some of the oldest are over 1,000 years old.

Native Oak populations suffer from a number of pests and diseases but usually the effects are temporary and the trees soon return to full health. However, if an individual tree is seriously damaged for several consecutive years, it can develop 'Oak decline'. In this weakened state, Oaks are attacked by other organisms that would not usually affect a healthy tree but may contribute to Oak decline and eventually cause its death.



## Ash

In the UK, Ash (*Fraxinus excelsior*) is the third most common broadleaved species (after Oak and Birch) and is a native species that is widespread throughout woodlands and hedgerows.

Ash can suffer from a variety of root and trunk rots that can cause late flushing (opening of leaves in spring), thinning foliage and decline. Recently, a new and often fatal disease, *Chalara* dieback of Ash, has been found in Britain but has become widespread in mainland Europe over the past two decades.



## Horse Chestnut

Horse Chestnut (*Aesculus hippocastanum*) is native to south-east Europe but was introduced into the UK over 300 years ago. Its striking creamy-white flowers appear in early June and provide pollen for many insects.

Over recent years a number of pests and diseases have spread steadily through Horse Chestnut populations, which can be very damaging.



## Oak pests and diseases

### Oak mildew

- A white or greyish-white powdery coating on leaves and shoots
- Some leaves may shrivel and blacken

Oak mildew is caused by the fungus *Erysiphe alphitoides*. Look closely (perhaps with a magnifier) to see that the white patches consist of tiny powdery threads. It was first found in England in 1908 and is now common. Oak mildew infects younger leaves and the tips of shoots, especially the second growth of leaves in summer. It is most severe during warm, wet summers when humidity is high. Oak mildew does not kill a tree but can cause it to weaken and contribute to Oak decline (see [Oak decline](#) below).



### Knopper gall

- Ridged and knobby protrusions on acorns (from July onwards)

Knopper galls are caused by a tiny gall wasp called *Andricus quercuscalicis*. If you cut open the gall, you should see the white wasp grub (larva). The wasps arrived in southern England in the 1950s and have now invaded most of the UK. The wasp does not kill the tree, but affected acorns cannot germinate.



### Tortrix roller moth

- Loss of leaves in May and June
- Edges of leaves curled up into a tube

The roller moth, *Tortrix viridana*, is a native species of micro-moth. The moth caterpillars feed on tender new leaves. Heavily infested trees can be completely defoliated (lose their leaves), affecting the tree's ability to photosynthesise. When the caterpillars pupate (become an adult moth), they roll the leaf edges around themselves, hence the name 'roller' moth.



### Oak decline

- Stem bleeding – dark fluid oozing from vertical cracks in the trunk
- D-shaped holes in the bark (about 2-3mm in diameter)

Oak decline is caused by a combination of pests and diseases which act together. Early signs are yellowing or fewer leaves; later, dead braches can be seen. In its severe form, look for dark weeping patches on the trunk, which dry to a black crust. D-shaped holes in the trunk bark (see inset photo) can be a sign of *Agrilus* oak beetles that may be attracted to weakened trees suffering from Oak decline.



# Ash pests and diseases

## Ash bud moth

- Wilted and blackened leaf shoots (from May onwards)
- Small holes in buds and at the base of wilted shoots

The Ash bud moth, *Prays fraxinella*, is a native species of micro-moth. The moth caterpillars feed on Ash leaves and make tunnels in Ash buds or in the bark at the base of new shoots. If holes are mined in the base of the bud, the leaf shoots may either fail to flush (open and grow) or may flush but then wilt and blacken. You may also see caterpillars' entrance/exit holes, and silken webs. Symptoms are most obvious on younger trees.



## Ash key gall (or cauliflower gall)

- Woody encrustation on the stalk of Ash keys
- Can be found alongside healthy Ash keys

Ash key galls are caused by the mite *Aceria fraxinivorus*. The crusty galls are green at first, but later become brown. Older galls can remain attached for over a year, so they stay visible all year round. The galls make Ash keys heavier, so wind dispersal is hindered and the seeds are not carried as far.



## Nectria canker

- New cankers look like a depression on the trunk or branches
- Older cankers look like a target: concentric rings of dead wood

Nectria canker is caused by the fungus *Neonectria galligena*. It is a native disease which may be linked to existing wounds and can cause branches to break. The canker (patch of dead or infected wood) usually has a small side branch or wound at its centre. Cankers are smooth or ridged, rather than gnarled or knobby. In the autumn you may see the fungal fruiting bodies – small (1-2mm) orange-red spheres or dots at the edge of the canker.



## Ash decline

- Death of a number of twigs and branches
- Poor growth in the crown

Ash decline is caused by a combination of factors that affect the roots and cause a gradual decline in the tree. It is common in hedgerow trees beside ploughed fields, especially on drier sites.



Check the symptoms for Chalara dieback of Ash (see overleaf) before diagnosing Ash decline.

# Horse Chestnut pests and diseases

## Horse Chestnut leaf blotch

- Red or brown blotches on leaves, often outlined in yellow
- Hold the leaf up to light – the blotches are not see-through

Caused by the fungus *Guignardia aesculi*, this disease was first reported in the UK in 1935. Blotches are on the leaf tips and edges, and you may also see tiny black dots in the blotches. Sometimes the whole leaf turns brown and shrivels. Leaf blotch is considered disfiguring rather than damaging. Look carefully, as leaf blotch can be present when Horse Chestnut leaf-miner is also present.



## Horse Chestnut leaf-miner

- Brown blotches on the upper or lower surface of the leaf
- Hold the leaf up to light – the blotches are see-through

Horse Chestnut leaf-miner *Cameraria ohridella* is a micro-moth first found in England in 2002. The moth caterpillars feed by tunnelling inside the leaves. The first signs appear in June. Severely damaged leaves shrivel and turn brown by late summer and then fall early. Horse Chestnut leaf-miner does not permanently damage the tree. Look carefully, as leaf-miner can be present when Horse Chestnut leaf blotch is also present.



## Bleeding canker of Horse Chestnut

- Rusty coloured liquid oozes from the bark on the trunk
- The liquid dries to a black crust at the point of exit

Caused by the bacterium *Pseudomonas syringae* pathovar *aesculi*, this disease suddenly appeared in the early 2000s. It attacks and kills the bark of infected trees. The bark is often cracked and disrupted. Severely affected trees have thinning crowns with dead branches, and ultimately the tree can die if the infection is very severe.



## Horse Chestnut scale

- Circular white spots topped with brown or orange on trunk or branches

Horse Chestnut scale is caused by the insect *Pulvinaria regalis*, first found in the UK in 1964. In May or June, the adult female produces a white woolly ovisac (egg capsule) into which she lays hundreds of eggs. She dies after laying, but remains attached to the ovisac. The white ovisacs could be mistaken for bird droppings, and although they disfigure the tree, they do not kill it.



# The Most Unwanted

## Help identify the serious threats to our trees

In this Guide we provide information about six pests and diseases that could have a very serious impact on our trees. These pests and diseases are either not yet present in the UK or they are not widespread (March 2015). Therefore, you are unlikely to find most of them during your survey but if you do it is important that you take the right action immediately.

The Most Unwanted pests are covered by plant health legislation which means that if you find them you must notify government officials so they can take any necessary action to control them. If you think you have found them (and there is more information on our website to help with identification) you must alert officials at the Forestry Commission directly, through:

- TreeAlert App: [www.forestry.gov.uk/trealert](http://www.forestry.gov.uk/trealert)
- Telephone: 08459 335577 (England and Wales), 0131 314 6156 (Scotland) or 0300 200 7847 (Northern Ireland)
- For more information see [www.forestry.gov.uk/forestresearch](http://www.forestry.gov.uk/forestresearch)



Take a photograph and submit it with your record

Plants affected: Ash

## Chalara dieback of Ash

*Hymenoscyphus fraxineus*

Limited distribution in the UK



Leaves turn black and hang on twigs. *Photograph taken in Slovakia © Andrej Kunca*



Dark diamond-shaped mark where twig meets the main stem. *Photograph taken in the UK*



Leads to death of branches. *Photograph taken in Denmark © Iben Thomas*

### UK status and other information

- A fungus now named scientifically as *Hymenoscyphus fraxineus*; first found in the UK in 2012 and believed to be an exotic introduction from Europe, possibly Asia
- Already infected a large number of Ash trees across continental Europe, with a significant loss of trees anticipated in the next 20 years
- At present there is a ban on imports and movement of Ash

### Why will any findings be important?

- We need to know about the distribution and extent of Chalara dieback of Ash
- Knowing exactly where it is will help us to manage the spread of this disease



Check the symptoms for Ash Bud Moth (see overleaf) before diagnosing Chalara

Plants affected: Ash

## Emerald Ash Borer

*Agrilus planipennis*

Not present in the UK



Adult beetles emerge from mid-May to late July. They have metallic green bodies, 7.5-13.5mm long. The male is shown, the female is similar.



Burrowing larvae (juveniles) in the bark create larval galleries. The tunnels typically created by these larvae meander and bend sharply.

*Photograph taken in Canada © Edward Czerwinski*



D-shaped holes (about 3mm in diameter), produced by adults emerging from the tunnels in the bark.

*Photograph taken in the USA © Debbie Miller*



Initial thinning and yellowing of the foliage (general or limited to certain branches). Fissures (narrow cracks) form in the bark, caused by growth of scar tissues.

*Photograph taken in the USA © Steve Katovich*

### UK status and other information

- Although there is no evidence to date that the Emerald Ash Borer is present in the UK, the increase in the global movement of wood and wood packaging poses a significant risk of its accidental introduction
- Native to Far East Asia, the Emerald Ash Borer was confirmed as established in Moscow, Russia, in 2007 and is spreading westwards
- Emerald Ash Borer has killed many of the Ash trees in some parts of the USA since its discovery there in 2002

### Why will any findings be important?

- Should it arrive in the UK, early detection will give us the best chance of control
- Ash is an important broadleaf tree in the UK. It makes up nearly 15% of all broadleaved woodlands and is a distinctive part of the UK landscape, as well as having many economic uses such as furniture making and flooring. The Emerald Ash Borer has the potential to devastate our populations of Ash

Plants affected: Oak

# Oak Processionary Moth

*Thaumetopoea processionea*

Very limited distribution in the UK



Caterpillars build nests (8cm or larger) that form white silken clumps visible on tree trunks from April to June.

Newly hatched caterpillars have a brown body and dark head. As they grow, they lighten in colour.

## UK status and other information

- Imported on Oak trees from continental Europe
- First found in trees in the west and south west of London in 2006. By July 2012, it had also been found in south London and Berkshire
- Caterpillars follow each other in head-to-tail processions when feeding, hence the name

## Why will any findings be important?

- Oak Processionary Moth caterpillars feed on the leaves of oaks causing serious leaf loss
- Human health risk: the caterpillars are covered in toxic irritating hairs. Contact with, or inhalation of, these hairs can lead to skin irritation and allergic reactions. Do not get close to larvae or their nests. Take notice of any warning signs in place

Plants affected: Pine

# Pine Processionary Moth

*Thaumetopoea pityocampa*

Not present in the UK



Caterpillars build nests that form white silken clumps near the tops of pine trees. *Photograph taken in the USA © John Ghent*

Caterpillars have orange brown backs with bluish-grey bands. *Photograph taken in France © François-Xavier Santonge*

## UK status and other information

- Since the 1990s the pest has been moving north through France and is now breeding near Paris; it could spread to the UK
- One population of caterpillars was found in a UK nursery in 1995 on Scots Pine imported from Europe in 1994 but it did not become established

## Why will any findings be important?

- The caterpillars feed on the needles, causing severe defoliation in some cases
- Human health risk: the caterpillars are covered in toxic irritating hairs. Contact with, or inhalation of, these hairs can lead to skin irritation and allergic reactions. Do not get close to larvae or their nests. Take notice of any warning signs in place

Plants affected: Many, especially Maples

# Asian Longhorn Beetle

*Anoplophora glabripennis*

Not yet established in the UK

- Adult Asian Longhorn Beetles are black, shiny, 20-35mm long and 7-12mm wide.
- Antennae are very long. They are black but each segment has a distinctive blue-grey or a creamy-white base.
- Each wing-case has about 20 distinctive, irregular, white spots.
- Larvae cause the most damage as they tunnel internally through trunks and branches. Adults exit through holes on the trunk, around 10mm in diameter. If the holes are near the roots, it is most likely to be Citrus Longhorn Beetle (see below).



## UK status and other information

- Major outbreak in Kent in 2012, with two thousand trees felled. Traced to wood packing imported from the Far East

## Why will any findings be important?

- If they became established, these beetles would be a major threat because they can infest a wide range of broadleaved trees
- Tunnelling by larvae leaves the tree more susceptible to diseases and wind damage

Plants affected: Many, especially Maples

# Citrus Longhorn Beetle

*Anoplophora chinensis*

Not present in the UK

- Adult Citrus Longhorn Beetles are black with variable white markings and are around 21- 37mm long.
- Antennae are longer than their bodies (between 1.2-2 times body length) and are black with white/light-blue bands.
- Larvae cause the most damage as they tunnel internally through lower trunks and roots. Adults exit through holes of around 10mm diameter in the trunk. Holes made by the Citrus Longhorn Beetle are usually found at the base of the trunk, near the roots.



## UK status and other information

- A few have reached the UK on trees imported from China, Japan and South Korea.
- So far they have been intercepted before escaping into the wider environment.
- No recent sightings

## Why will any findings be important?

- If they became established, these beetles would be a major threat because they can infest a wide range of broadleaved trees
- Tunnelling by larvae leaves the tree more susceptible to diseases and wind damage