

Introduction

Trees are a vital and much loved part of our lives. In towns and cities, trees bring nature right to our doorsteps and in parks and open spaces, help to create green and pleasant surroundings for leisure and relaxation. Trees are vital for wildlife too, providing birds, insects and mammals with a home and food. They are also part of our national history and heritage and play an important role in helping to regulate our climate by cooling in hot weather, reducing flooding and soil erosion, and capturing and storing carbon.

This survey is about the condition of our trees. In recent years the number of pests and diseases attacking trees has increased leading to a decline in tree health and in some cases tree loss. In order to manage these problems most effectively we need to study our trees and record information about their condition and any pests and diseases that are found. You can carry out your own tree survey by following the instructions on this [Field Guide](#). The information will be used by scientists to help monitor and protect trees so please upload your results to the OPAL website www.OPALexplorenature.org

About the Tree Health Survey

There are two activities in the Survey:

- **Activity 1** Get to know your tree
- **Activity 2** Pests and diseases on Oak, Ash and Horse Chestnut

You will need

- Field Guide and Field Notebook (to record your findings), Tree Guide, Most Unwanted Guide, tape measure

Useful items to take with you (if you have them)

- A mobile phone
- A camera
- A map and/or Global Positioning System (GPS) device – help with your location is also available on the OPAL website when you upload your results

This survey should be carried out when trees are in leaf from May to the end of September. Take care not to harm the environment during your survey: www.OPALexplorenature.org/opalcode

Before you carry out the survey, please read the Health and Safety information provided on page 6 of the Field Notebook.

+ Safe fieldwork

Trees and woodland are generally safe places, but it is important to take care.

- + Do not do the survey in windy weather
- + Young children must be supervised
- + Avoid any areas with hanging deadwood
- + Do not do this survey on your own
- + Do not climb on stacks of logs
- + Wash your hands thoroughly afterwards especially before eating
- + Avoid skin contact with hairy caterpillars, as the hairs may contain skin irritants
- + Clean your footwear thoroughly afterwards

Activity 1: Get to know your tree

20 minutes

Choosing a site

All you need is safe access to one or more broadleaved trees (trees with wide leaves not needles or scale-like leaves found on conifers). Activity two is for Oak, Ash and Horse Chestnut trees only so select these trees first if possible, but you can survey any tree species in Activity 1. A [Tree Guide](#) is included to help you with tree identification.

A Start surveying



Questions **1-5**

Record the date and location details of your Tree Health Survey in your [Field Notebook](#)

6 What is the ground cover around the base of the tree?



a Grass or other plants



b Bare soil



c Hard surface (like pavement)



d Fallen leaves

7 If there are fallen leaves beneath the tree, how many are there?



a A few



b A lot



c Ground is completely covered

B Identification

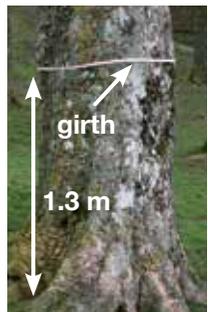
8 Record the name of the tree (tree species), using the [Tree Guide](#) to help you.



You can submit a photograph of the tree to the OPAL website with your results.

C Tree characteristics

9 Measure the girth (circumference) of the trunk at 1.3 m (130 cm) above the ground.



10 Measure the height of the tree. Instructions can be found on the other side of this [Field Guide](#).

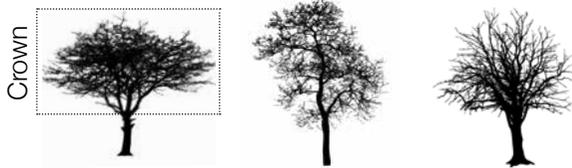
11 Is the tree taller or shorter than most of the other trees nearby?

- a** Shorter than most other trees nearby
- b** Same height as most other trees nearby
- c** Taller than most other trees nearby
- d** There are no other trees nearby

D Crown

The **crown** is the leaf cover and branches at the top of the trunk (see diagram below). Walk away from the trunk to get a better view. Ignore any low branches beneath the crown. A healthy tree in summer has full leaf cover, however at any time during the year pests and diseases can cause twigs, branches and even the trunk to lose leaves and die.

12 Which best shows the shape of the tree?

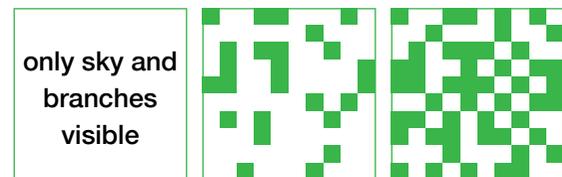


a Spreading b Oval c Fan



d Column e Cone

13 Stand underneath the tree, next to the trunk and look up. Estimate how much of the view is made up of leaves. Choose the closest fit from the five options.



a No leaves b 25% c 50%



d 75% e All leaves

14 Can you see any dead wood in the crown (branches that have no leaves or twigs on them when the tree is in full leaf)? • YES • NO

If YES how much dead wood is there?

- a Less than a quarter of the tree
- b Between one quarter and one half
- c Between one half and three quarters
- d More than three quarters

E Leaves

If leaves become brown or yellow before autumn, it is a sign that something is wrong. Leaf browning may be caused by many different factors including insects and sea salt. Leaf yellowing may be caused by a problem with the roots, and is often the sign of a longer term issue.

15 What types of leaf browning can you see? Tick all that apply.

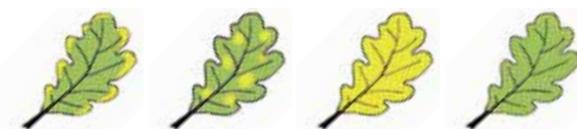


a Brown leaf edges b Brown spots c Leaves all brown d None

16 If there is leaf browning, how much can you see on the tree?

- a Less than a quarter of the tree
- b Between one quarter and one half
- c Between one half and three quarters
- d More than three quarters

17 What types of leaf yellowing can you see? Tick all that apply.



a Yellow leaf edges b Yellow spots c Leaves all yellow d None

18 If there is leaf yellowing, how much can you see on the tree?

- a Less than a quarter of the tree
- b Between one quarter and one half
- c Between one half and three quarters
- d More than three quarters

19 Can you see any of the following signs of insect damage on the leaves?



a Holes in the leaf



b Leaf mining



c Plant galls

d None

F Wildlife

It is useful to know how the tree supports biodiversity.

20 Record any animals, signs of animal activity, plants or fungi that you see (for example, birds, moss or lichens).

Activity 2: Pests and diseases on Oak, Ash and Horse Chestnut

20 minutes

Activity 2 is about the pests and diseases of Oak, Ash and Horse Chestnut. If you looked at Oak, Ash and Horse Chestnut in Activity 1, please carry out Activity 2 on the same tree.

Refer to the other side of this [Field Guide](#) for photographs and more information to help you identify these pests and diseases. Record any that you see in the [Field Notebook](#).

If you see any of the pests and diseases, take a photograph and submit it to the [OPAL website](#) with your results.

Most Unwanted

Keep a look out for six Most Unwanted pests and diseases that could pose a serious threat to our trees if they become established in the UK. Refer to the [Most Unwanted Guide](#).

Now enter your results

Your findings are very important so please enter them onto the OPAL website. You will be able to see your results and the results submitted by others displayed on the interactive online map.

Your information will be used to study the condition of the nation's trees and the distribution of tree pests and diseases.

For more information about tree health go to www.OPALexplorenature.org or www.forestry.gov.uk/forestresearch

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Oak pests and diseases

a 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 hand lens) 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 **d** below).



b 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.



c 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.



d Oak decline

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

e 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.



f 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.



g 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 (1-2 mm) orange-red spheres or dots at the edge of the canker.



h 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 in the [Most Unwanted Guide](#) before diagnosing Ash decline.



Horse Chestnut pests and diseases

i 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

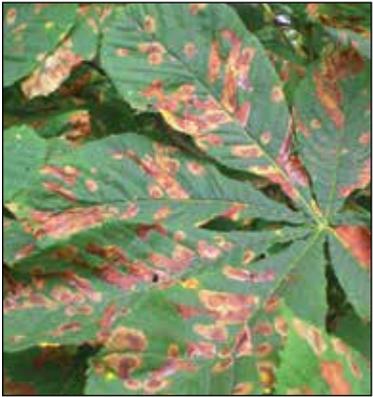
Caused by the fungus *Guignardia aesculi*, this disease was first reported in Britain in 1935. Blotches are on the leaf tips and edges, and you may also see tiny black dots in the blotches. Sometimes the whole leaf turns brown and shrivels. Leaf blotch is considered disfiguring rather than damaging.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



j 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.



k 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.



l 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 Britain 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.



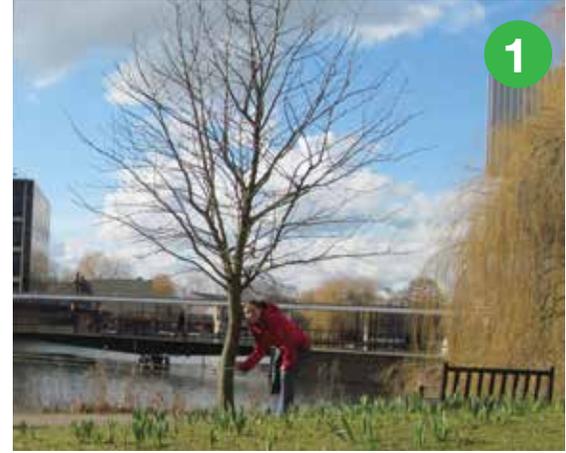
Tree height

If you have printed this guide on A4 paper, you may wish to trim the margins so that the arrows for Top of tree and Bottom of tree are at the edge

If your tree is too tall to measure with a tape measure, use this guide (Question 10). You will need two people.

- 1 The first person stands next to the tree.
- 2 The second person takes this Field Guide and walks back away from the tree, holding the card at arm's length. The top of the tree needs to line up with the top of the card and the bottom of the tree needs to line up with the bottom of the card.
- 3 When the person with the card is in position, they should guide the person at the tree to point at the trunk exactly at the level at the 10% mark shown at the bottom of this Guide.
- 4 Once the person at the tree has found the correct point, use the tape measure to measure the height in metres of this point from the ground. This will give you 10% of the height of the tree. Multiply this figure by 10 to work out the actual height of the tree.

If the tree is very tall, use the 5% mark on the side of this Guide instead. Multiply this figure by 20 to work out the actual height of the tree.



10%

5%

