



# Oak Oak

## Visual evidence of Oak dieback

Recent publicity in some news media has focused attention on a problem with the health of oak trees in Great Britain known as “oak decline” or “oak dieback”. Here, Dr Joan Webber, senior plant pathologist with the Forestry Commission’s Forest Research agency, outlines the issue.

The terms “decline” and “dieback” are used by scientists, tree pathologists, foresters and arborists to describe a condition in which a number of damaging agents interact with one another to weaken trees and bring about their deterioration, sometimes resulting in premature death.

These damaging agents can include insects, diseases and extreme weather conditions. Healthy trees can usually withstand attacks by the biological agents when they occur alone, but if consecutive attacks occur over several years, or if they occur at the same time as the trees are being stressed by other factors, the end result can be very debilitating. It sometimes results in mortality.



# Decline Dieback

For example, a healthy, unstressed tree is able to withstand an attack by a range of insects, but might suffer significant damage if it comes under prolonged attack when it is already severely stressed by drought.

Oak dieback in Great Britain mostly affects pedunculate oak (*Quercus robur* - also known as English oak), and hybrids of pedunculate and sessile oak (*Quercus petraea*), which is the only other oak species native to Great Britain. In general, pure sessile oak, and non-native oak species grown in Great Britain in significant numbers, such as holm and Turkey oaks, have so far been little affected.

The symptoms start with a change in the appearance of the foliage, usually as an initial deterioration in the appearance of the leaves - they can be a paler green than usual, or turn yellow - and they may be sparser than normal. If the condition persists, the leaf deterioration is followed by progressive death of fine twigs, and then branches, over a number of years. In the worst cases the whole tree dies, and gives the appearance of dying from the top down.

Currently, most reported cases of declining oaks are in central, southern and eastern England. One of the highest-profile occurrences is in Charnwood Forest, Leicestershire, where there are high levels of oak mortality in some areas. It is also reported in other countries. For example, France experienced a peak during the 1970s, and Germany experienced a peak in the 1980s.

Nor is oak dieback new to Great Britain. There have been two previous serious episodes here during the past century - during the early 1920s, and between 1989 and 1994. Reports of it declined after 1994 for a few years, then began increasing significantly again from 1997 to the present.

The exact cause and nature of the condition are still not fully understood by scientists, and are the subjects of on-going research. During the 1920s episode,

defoliation by caterpillars of the oak leaf roller moth (*Tortrix viridana*) and damage caused by oak mildew fungus (*Erysiphe* (previously *Microsphaera*) *alphitoides*) were thought to have played a critical role. Scientists also noted the presence of honey fungus (*Armillaria* species) on the roots of many of the dead trees, but believed its role was principally to finally kill off trees that were already “irretrievably damaged”. Drought was considered to be a key factor in the 1989-1994 peak, followed by attacks on the weakened trees by the buprestid beetle (*Agrilus pannonicus*). Exceptionally cold weather between 1985 and 1987 was thought to have been a factor in the 1980s peak in Germany. Research has also shown that infections of the fine feeder roots by one or more species of *Phytophthora* fungi can predispose oaks to decline.

It is not always fatal: affected trees can sometimes recover when one or more of the contributing agents reduces in number or severity. For example, many sickly trees affected during the 1920s episode showed a marked improvement in condition over the same period that the population of oak leaf roller moth declined.

Each episode of oak decline tends to have its own particular characteristics. In the current episode, the progress of trees’ decline can be very rapid, with some individual trees dying within four years in the most serious cases. We will be working to understand what factors can cause such rapid decline.

During the period 1998-2000, Forest Research was involved in an EU-funded project which looked at the role of root pathogens of oak as decline-inducing factors. Further information about this project is available at <http://ec.europa.eu/research/agro/fair/en/fr3926.html>. More recently, Forest Research has carried out a preliminary assessment of the current peak of oak decline, and plans to expand research in this area over the next few years.





**Agrilus exit holes**

*In the meantime, the best things that woodland managers can do to ensure healthy trees are to observe the usual guidelines on sound management, the main ones of which are:*

**match trees to the planting site**, i.e. plant trees that are best suited to the soil type, weather, sunshine, wind, drainage and other characteristics of the site; plant trees of local provenance and origin. Research and experience have shown that trees grown from seeds descended from trees that have inhabited a particular locality for centuries are best adapted to local conditions and prove the most resistant to insects and diseases; and

**practise good woodland management**, such as thinning, weed control and minimising damage by mammals such as grey squirrels, cattle, sheep and deer.

Inevitably in these situations, people ask whether climate change is a factor. This is possible, but it's too early to know for sure whether it is playing a role in the current episode. However, we do know that most of the pests and diseases that currently affect British trees will benefit from the kinds of weather, such as milder, wetter winters, that we expect in Great

Britain as climate change progresses.

We also get people asking whether it's even worth continuing to plant pedunculate oak, but we see no reason to discourage people from continuing to plant these magnificent and valuable trees. They play important roles in our environment, landscape and economy, and as a social resource for purposes such as recreation. There is always the possibility that some trees will be less affected by oak decline, and these could form the basis of our future populations of pedunculate oak, but we have to keep planting them so that we can identify these trees.

It is always a cause for concern when significant numbers of important tree species appear to be under threat, but we need to keep things in proportion. Reported outbreaks are still relatively small and isolated, and the number of trees affected is still small in comparison with the total number of oak trees in Britain. (Measured in terms of woodland area, oaks are the most widespread tree species in England, and the third most widespread tree species in Great Britain overall.) We also need to remember that trees and woodland live through cycles of natural phenomena such as climate, weather, and pests and diseases. These cycles can be measured in years and even decades, and there is a limit to what human intervention can do to influence their outcomes. The most important thing we can do is to research and understand the causes so that we can formulate good management advice for woodland managers. It is also important that we remain vigilant against accidentally importing new and damaging pests and diseases from outside the United Kingdom.

More-detailed technical information is available in the Forestry Commission's Information Note Number 22 - "Dieback of Pedunculate Oak", a PDF of which is available on line at [www.forestry.gov.uk/publications](http://www.forestry.gov.uk/publications). Woodland managers can also contact their local regional or conservancy offices - visit [www.forestry.gov.uk/contacts](http://www.forestry.gov.uk/contacts) for contact details.

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