



# Beetles, bacteria and Acute Oak Decline

Hot on the heels of his exclusive article focusing on chalara ash dieback, Dr Terry Mabbett returns warning of another threat, this time to the UK's oak trees

**Great Britain lacks an official national tree emblem. Moves are afoot to adopt *Pinus sylvestris* (Scots pine) as Scotland's 'national tree', while our two native oaks (*Quercus robur* and *Quercus petraea*) are obvious choices for England and Wales as 'English Oak' and 'Welsh Oak'.**

Over the years a number of leading figures have intimated that Britain should have a 'National Tree'. The Mayor of London Boris Johnson chose an English oak. But don't get too carried away because a fast moving lethal syndrome dubbed 'Acute Oak Decline' (AOD) could wipe these iconic native oak trees from our landscape.

First reaction from many green-keepers might well be "what's AOD?". Sadly it's been killing trees in the UK for at least seven years but the problem has received relatively little publicity. There are several reasons for this. Initially AOD was regional and largely confined to Norfolk, Suffolk and Essex. It's now epidemic throughout East Anglia and spreading rapidly across the Midlands and into southern England. Affected trees are being found in Wales and as far north as Nottinghamshire.

Secondly AOD is not a classic disease (like Chalara ash dieback) and therefore not caused by just one plant pathogen in its own right. Acute oak decline appears to be

**MAIN LEFT:** Close up on trunk bleeds that strongly suggest acute oak decline

**RIGHT:** Profuse bleeding of dark coloured fluid from between the bark plates is one of the two classic symptoms of acute oak decline

(Both pictures are courtesy of Forestry Commission)



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caused by the interacting activities of a bark boring beetle (*Agrilus biguttatus*) and at least one bacterium. Many of the bacteria associated with AOD are completely new to science. *Agrilus biguttatus* has been known in the UK since the nineteenth century but until now as a relatively rare insect associated with dead or naturally declining oaks. This complicated association is why AOD is classified as a 'decline' rather than a disease. The word decline usually infers gradual but there is nothing gradual about AOD which can kill a mature oak in less than five years.

Two eye-catching external symptoms of AOD are profuse bleeding of dark coloured fluid from between the bark plates and tell-tale 'D' shaped exit holes on the trunk left by adult beetles after hatching from the pupae inside the tree.

Internal symptoms are tissue necrosis (thought to be caused by the pathogenic bacteria) and extended galleries near the necrosis and created by beetle larvae tunnelling in and around the phloem (food conducting tissue) and cambium. Cambium is the lateral meristem composed of dividing cells and responsible for growth in girth of the tree. This is the damage which

appears to deliver the death blow to AOD affected oak trees.

AOD is particularly cruel because it only appears in oak trees over 50 years old. Government scientists at Forest Research appear to be a long way away from unravelling the exact mechanics of AOD and until they do there is no hope of any control measures.

An added problem not yet widely appreciated is the interacting effect of oak processionary moth (OPM), a serious insect pest of oak trees featured by Greenkeeper International (Beware of OPM on the Golf Course) in January 2012. Experience in Germany, where the insect pest (OPM) is rife, shows infested oaks with additional extensive damage caused by *Agrilus biguttatus*.

OPM is currently confined to London with a small satellite infestation in Berkshire and yet to spread into areas of the UK where oak trees are suffering from acute oak decline.

Indications are that if these two separate problems (OPM and AOD) came together on a wide scale the combined implications for oak trees in damage and death could far outweigh what they are capable of individually.

about the author



Dr Terry Mabbett

Dr Terry Mabbett is a disease, pest and weed control specialist with forty years international experience covering research, advisory and journalism. His current fields of focus are professional turf and alien insect pests and pathogens of Britain's native and naturalised trees.

ABOVE: Characteristic 'D' shaped exit holes of the adult *Agrilus biguttatus* beetle which invariably accompany bleeding from the bark

BELOW: Larvae of *Agrilus biguttatus* excavate long galleries in and around the phloem and cambium tissue (Picture courtesy of Forestry Commission)

BOTTOM: Adult *Agrilus biguttatus* beetle (Picture courtesy of Forestry Commission)



### English oaks on the golf course

English oaks are not widely planted on golf courses, especially near to greens, and for good reason. The English oak tree's root system is far reaching and able to undermine greens from a distance, and therefore years of investment in professional sports turf. Nevertheless mature English oaks are common features on many golf courses, mostly as 'relics' from farmland, woodland and country estates on which the courses were built – and also due to their sheer longevity.

Many courses have oak trees of 100 to 200 years old and it is not uncommon to find some with specimens of 400 to 500 years

at Forest Research is completely overwhelmed. The vast majority of sites on the Forestry Commission's AOD Distribution Map are reported by landowners and will not have been visited by Forest Research Scientists or had samples taken for testing and confirmation.

Despite the seriousness of AOD at this very moment the government has provided relatively little funding for research.

This has been left to the goodwill and generosity of charities like Woodland Heritage.

Chalara ash dieback was the result of an alien plant pathogen allowed to enter the UK despite years of unheeded warnings and corresponding negligence by the UK plant health authorities. As such

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or more. As such they are large sentinel trees occupying prime positions and in this context are essentially irreplaceable. Indeed a nationwide survey would almost certainly show UK golf courses to be important custodians of ancient and veteran trees and English oak in particular.

Not only the mature English oaks on the golf course add to the landscape, because oak trees in the woodlands, hedgerows, meadows and parklands contiguous with golf courses play an important part too.

More than any other deciduous tree the English oak adds extended colour to a golf course. Leaves in their attractive tan coloured autumn condition remain on trees right through November and well into December.

Once down on the ground English oak leaves with their high tannin content (tannin is a natural preservative) stay crisp and dry causing few problems for turf grasses beneath and are relatively easy to clear up and remove.

Greenkeepers who suspect 'acute oak decline' on their courses are advised to report their suspicions to the UK plant health authorities\* but should not expect a lot of support or even a visit to confirm the report.

This is because the small team of scientists working on AOD

it has become a political pathogen with government now throwing everything at the problem to avoid further embarrassment.

The agents causing acute oak decline are entirely different. *Agrius biguttatus* is a native 'buprestid' (metallic glossy bark boring) beetle. The associated bacteria - though new to science - were probably present in the UK all along, but simply not identified.

This difference has meant AOD not receiving the level of attention and investment afforded to chalara ash dieback but that could change anytime now with AOD spreading quickly throughout the country and causing increasingly widespread and heavy lethal damage in the UK's native oak tree population.

In the not too distant future the UK government will be faced with what looks likely to be a forlorn attempt to save our two most important native trees, English oak and common ash. UK golf courses will be much the poorer if they disappear. If we did lose English oak the country could end up like Mauritius which displays the 'Dodo' on the country's coat of arms.

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**BOTH IMAGES: UK golf courses are the custodians of many ancient and veteran English oak trees. This has its roots in farmland over which this south of England course was laid out in 1923.**