A new disease of oak trees;
Acute Oak Decline (AOD), has taken hold in Suffolk

Acute Oak Decline (AOD), a decline in which bacteria and *Agrilus biguttatus* appear to have key roles is affecting Suffolk's oak trees. This is causing concern among tree professionals, local authorities, the Woodland Trust, National Trust and the CLA, as trees can die within three years of symptom development.
There is agreement that urgent extra funding is required to increase AOD research as we are dealing with a complex involving a number of organisms that are difficult to work with and the increased incidence has been so alarming that no more time should be lost in getting to the cause of the problem. So far research has shown that the bacteria are new to science, although nothing is known about their origin at this stage. Furthermore at the present time there is little understanding how the bacteria spreads and what actually is killing the trees, whether It Is the bacteria or secondary girdling by a beetle or poor root health or a combination of these factors? In Suffolk, we have numerous cases of AOD in both our landscape and woodland trees and this is causing premature deaths.

Gary Battell, Suffolk County Council's Woodland Advisory Officer says, "We should be very concerned about AOD, however, there is not too much we can do until we understand its cause and effects. Dr Sandra Denman and fellow scientists from Forest Research, the official research agency of the Forestry Commission, are investigating the causes of the problem and have done a truly excellent job. However, there is an urgent need for an adequate budget for staffing, to speed up research, implement a monitoring programme and provide best advice as we all want to see oak trees in our Suffolk landscape, habitats and in homes as furniture. At present we think we have AOD present throughout Suffolk in landscape trees and in many of our woods, however, specimens will have to be analysed by scientists for verification of bacterial species present and indications of the presence of *Agrilus. Agrilus* beetle is associated with most of the symptomatic trees and scientists and entomologists will have to establish precisely what the relationship between the bacteria and the larvae of the beetle is with regard to AOD. A major concern must be for our ancient trees in historic parks like Staverton and the condition of our oak trees in Suffolk's ancient woodland."

The increase in pests, pathogens and diseases in Britain in general is largely due to globalisation of trade in plants and plant products, as well as climate change. All agree there is an urgent need for Defra to support and fund a project that researches, monitors and gives best advice on tree pests, pathogens and diseases as these are having an increasing impact globally on the health of the plant life that we all depend on. John Jackson, Director of the Royal Forestry Society says, "Urgent action is not an option - it's a necessity".

Suffolk people have done much to raise the concerns of AOD. Peter Goodwin a founder of Woodland Heritage and owner of the fine furniture maker, Titchmarsh & Goodwin in Ipswich has obtained charitable funding to support research. Peter is actively lobbying for increased Government action and an adequate project budget for Acute Oak Decline and other tree diseases currently affecting Britain's trees.

Peter Goodwin told BBC news "I have never seen anything like it (AOD). Its spread over the last two years has been quite alarming; very little was known about the cause and the possible involvement of bacteria contributing to this disease complex; we have never had a bacterium that is capable of doing what this one is doing on oak."

AOD affects the UK's two native species of oak - sessile and pedunculate; however, there must be some concern that this could affect other species in the future for example in Spain a similar condition Is reported on holm oak and Pyrenean Oak (Meiojo).

Acute Oak Decline can kill an infected tree in just a few years
Information from Forest Research, the scientific department of the UK Forestry Commission, says the new disease affects oaks more than 50 years old.

Symptoms are "extensive stem bleeding" in which dark fluid seeps from small cracks in the bark and runs down the tree trunk.

In early stages of the disease, the health of a tree's canopy does not appear to be affected, however, the crown does thin and there are often a signs of branch tip death as the tree succumbs to AOD.

Forest Research pathologists have isolated a previously unidentified bacterium, now named Gibbsiella quercinecans, they believe is highly likely to be playing a key role in the AOD. However, the full cause of the condition is thought likely to be complex, involving a number of factors besides the bacterium; *Agrilus* biguttatus is also considered to play a key role in the problem.

Mature Oaks (>50 years old) are affected, and trees are characterised by symptoms of extensive stem bleeding. Both of Britain's native oak species, pedunculate oak *Quercus robur* and sessile oak Q. *petraea* are affected.

The bleeding patches usually become visible between one and two metres above the ground and can extend into the canopy. Beginning in spring fluid runs down the stem, staining the bark.

The bleeding often stops at certain times or the year, leaving dry, black streaks on the stems, The dried fluid can cake or form a crust around the split.

Underneath the outer bark at the bleeding point, the inner bark breaks down creating a lesion, which develops into a fluid-filled cavity

A cross-section taken through a bleeding point reveals a cavity between the outer bark and the heartwood and necrotic tissue breaching the cambium and progressing into the sapwood.

In most cases there is evidence of insect attack associated with the stem bleeding, particularly by the buprestid beetle, *Agrilus biguttatus.* °D'-shaped exit holes of *Agrilus* might occur in close proximity to some stem bleeds. At this stage *Agrilus* beetles are not considered to be the single cause of acute oak decline although the role they play may be central, but they are thought to be 'opportunistic' on weakened trees, that is, they take advantage of tree's weakened state and infest it which further weakens it and may even hasten its death.
The establishment of AOD on a site is typically characterised by low numbers of trees being affected initially, increasing to the point where more than half the oaks on the site have extensive stem bleeding.