The Fabulous English Oak

Quercus robur the English oak is a large deciduous tree with a rounded, broad crown; branching is upright and spreading; growing to a height of 30 - 40 m. Growth rates are very slow although this species is very long lived i.e. 1000 years although the “norm” is 200 years. Because of their longevity some oaks form what we term veteran trees, normally distinguished by the hollow trunks. If you are lucky to see a veteran oak in your area then you are extremely privileged; these trees are very rare. Quercus robur has an extremely high ecological value supporting numerous insect and wildlife species. The timber is highly prized for furniture and building.

CULTIVATION A very hardy genus that grows optimally in deep fertile well-drained soil in sun or partial shade. English oak is very tolerant of city conditions (atmospheric pollution, salt) and high pH soils.

PESTS AND DISEASES Until recently the only disease problems that English oak were susceptible to were honey fungus and powdery mildew. However, there is now a great deal of concern with Sudden Oak Death discussed in greater detail in this edition of Tree Tips and Acute Oak Decline discussed in the previous edition of Tree Tips. Aphids and gall wasps are the major insect pests. Various bracket fungi can result in wood decay while deer and rabbit can prove problematic.
A common insect called the leaf miner moth does more long-term damage to horse chestnut trees than previously thought. The moth was thought to cause only cosmetic damage, but a study published in the journal Urban Forestry & Urban Greening shows the moth larvae attack the tree’s leaves, reducing their ability to capture sunlight and turn it into food. This loss in ability to produce energy, dramatically reduces seed size and quality, potentially stunting the tree’s growth.

The horse chestnut tree was first introduced to the UK in the 1600s. The future does not look promising for a tree that, up until six to eight years ago, had thrived in the UK for the past 400 years. Its white flowers are now a common sight in UK towns, cities, parks and woodlands. However, over the past eight years, this tree has been under attack by the leaf miner moth Cameraria ohridella. “Infected leaves are covered initially in small, brown patches which spread rapidly across the entire tree,” explains Dr. Glynn Percival from the University of Reading, UK. “Eventually leaves die and fall prematurely.”

This new study shows that damage may be long-term effecting the tree’s growth and reproduction. The researchers report that average seed weight, germination and growth rates decrease by up to 48% in trees showing infestation. And conker weights are halved in trees that show a very large amount of leaf damage. The team also observed decreases in stem growth, and in levels of sugars and starch in roots and twigs. This reduced the overall tree’s growth and ability to store energy. The largest impact was during the growing season, between late June and early July. This is when the tree switches from vegetative growth to storage and reproduction. “It is debatable whether smaller trees would be capable of long-term survival,” Dr. Glynn writes in the journal article. “The future does not look promising for a tree that has historically thrived in the UK.”

The general consensus amongst researchers remains that the horse chestnut leaf miner is a cosmetic pest. But Dr. Glynn believes that unless this invasive pest can be better controlled, horse chestnut-lined streets might be a thing of the past, as people opt for ornamental trees which are aesthetically pleasing all year round.

**Leaf miner moth damage to horse chestnut leaves.**

Damage can spread rapidly across the entire tree.

Illustration by Csaba Szaboky, Bugwood.org

Photos by Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org

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**Longest Avenue of Trees Protected (continued from front page)**

A spokesperson for Bartlett Tree Experts said: “Firstly we will apply a systemic insecticide to combat the leaf miner, which will help the tree by massively reducing the population of pests. Secondly, we will soil inject high phosphate fertiliser. This wakes the tree up to the fact it’s under attack from the bleeding canker and kick starts its immune system.

“Finally we will carry out root invigoration and soil decompaction. This breaks up the highly compacted soil around the tree’s root zone enabling new root development. At the same time we incorporate a large mulch bed also beneficial to the roots.

“This combined package should go a long way to help these fantastic trees survive in the urban jungle that trees find themselves in these days.”

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Research to slow urban tree growth

In 2009 Bartlett’s Research Laboratories took on a five year research project, “The effects of tree growth regulators (TGRs) on fast growing trees and application to utility arboriculture” in collaboration with a number of Distribution Network Operators (DNO’s) in the UK - Central Networks, Scottish and Southern Energy, Western Power Distribution, CE Electric and EDF Energy.

The research entails evaluating the feasibility of using TGRs to retard the growth of trees which are in close proximity to overhead electricity lines in the UK and the impact TGRs will have on tree growth. The use of TGRs is currently a common occurrence throughout the US and Canada, but has received little attention in the UK and Ireland.

Currently in the UK and Ireland pruning and/or clearing of trees and vegetation near power and electrical services is required for safety and legal purposes as well as to not interrupt services through damage to overhead lines. The strategy of pruning and clearing represents a substantial expenditure to DNO companies especially as in some circumstances landowners do not allow their trees to be pruned more than 0.5m to 1m; a concept known as a restrictive cut and consequently DNO’s may have to return annually to re-prune.

Six field sites throughout the UK are being used for the project and these sites are supported by thirteen smaller observational sites throughout the UK, representing a wide range of bioclimatic zones. Tree species selected for TGR evaluation aimed to represent those that occur commonly on or near overhead networks, such as oak, alder, willow, beech species etc.

The TGRs used for this research can be applied as either a foliar spray or soil drench/injection treatment. TGR’s are readily taken up through the roots, stems and leaves and are transported almost through-out the tree, to its site of action where it has a long term (3-5 year) growth retarding effect on shoot growth.

The benefits from previous research has constantly shown that TGRs can effectively extend the pruning cycle for up to four years and reduce the frequency of visits necessary to deal with restrictive cuts. We are hoping to obtain similar results with this research on TGRs in the UK and so far the results are looking promising. Other benefits from application of a TGR that are of interest include a reduced number of times required to cut hedges, improved flowering, greener leaves and improved drought tolerance.

What’s New in Horse Chestnut Bleeding Canker Control? Bartlett Research Awarded PhD Funding.

Since its introduction from the Balkans 400 years ago the horse chestnut tree has become one of the most prominent tree species grown within our parks, woodlands, cities and towns. About seven years ago, however, the horse chestnut suddenly became the victim of attack from a bacterial disease known as Pseudomonas bleeding canker. Pseudomonas bleeding canker causes black oozing thumb shaped cankers on the trunk. If the cankers link up, the tree can effectively become girdled and spiral into decline. Such is the extent and severity of this disease that many scientists have concluded that the horse chestnut will no longer be a major tree species within UK and Ireland landscapes over the next 40 years.

The Bartlett Tree Experts Company has always been recognised as the leading company actively seeking research solutions to these problems. Indeed their innovative thinking in developing a potential control strategy has just been awarded a prestigious National Environment Research Council award. The key to finding a solution comes from the fact that when trees are infected by Pseudomonas bleeding cankers most trees over time die. However, on occasion a tree can become badly infected and then start to recover with no signs of long term ill effects. This then begs the question “why is it that these trees recover while most others die”. Bartlett research has shown that the trees that recover contain within their wood structure a virus that attacks the bleeding canker bacteria. Viruses that attack bacteria are known as bacteriophages. Interestingly the use of bacteriophages to treat human diseases is used extensively and successfully in Russia and Eastern Europe but is used very rarely in Western medicine. Using the knowledge already gained from east European research offers real potential to inject these naturally occurring viruses into a horse chestnut tree to provide lifelong protection.

Of greater interest is that fact that this type of treatment also offers possible control solutions to new and recent tree diseases such as Sudden Oak Death and Acute Oak Decline where symptoms of infection are identical to those caused by bleeding canker on horse chestnut.

A tree suffering Acute Oak Decline.
Spring is quickly approaching and so is the threat of some potentially serious disease outbreaks. Anthracnose (fungal foliar disease) and fireblight (bacterial blight) are two diseases that occur early in the season and can produce symptoms that persist throughout the summer. This article intends to highlight these diseases.

**Anthracnose:** This is a foliar disease caused by several genera of closely related fungi. Highly susceptible species include sycamore, oak (especially white), maple, ash, and walnut. Foliar symptoms vary according to host species. On sycamore, white oaks, and maple, large irregular brown to purplish lesions develop along leaf veins. On ash, black oak, and walnut, discrete circular or angular lesions occur on leaves. Foliar lesions will coalesce causing distortion, blight, and defoliation. Symptoms first appear from May to mid-June depending on geographic location.

**Fireblight:** This disease caused by the bacterium *Erwinia amylovora* causes wilting and blackening of the blossoms and leaves of terminal shoots. This results in the characteristic shepherd’s crook. The affected plant parts remain attached to the terminal shoot. Cankers usually develop on stems as the disease progresses and serves as the over-wintering stage. Bacterial ooze can be seen exuding from these cankerous areas in early spring. All rosaceous plants are affected. Fireblight activity begins to occur in May through early June depending on geographic location.

For more information contact your Arborist Representative.

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**Fungal Fruiting Structures!?**

If you Google **fungal fruiting structure** or **fungal fruiting body** you will find most references lead to a commonly known group of fungi, mushrooms. These terms also refer to all types of spore producing bodies - scientists at the Bartlett Diagnostic Lab use the term ‘fungal fruiting structures’ for plant pathogenic fungi that cause leaf spots, cankers and blights. Photographs taken at our Bartlett Diagnostic lab use our new microscope mounted camera to show examples of two common fungal pathogens. *Diplodia pinea* (syn. *Sphaeropsis sapinea*) causes tip blight on pines and produces round shaped black fruiting structures in stem, needle and cone tissue, while *Tubakia dryina*, a common late season leafspot fungus forms a flat circular fruiting structure on the upper leaf surface of oak leaves.

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