

TREE TIPS

TREE & SHRUB CARE FROM BARTLETT TREE EXPERTS



It's All Up in the Air

by Ian Barrow,
General Manager

We were asked by Buckingham Palace to find a non-climbing method of regularly inspecting the Plane trees in the Palace grounds for signs of Massaria, a fungal infection that affects the upper surfaces of main limbs, weakens the wood structure and causes limb failure. Most of the Plane trees in London's central parks are potentially infected and the only way to check for signs of infection is to climb each high risk tree and visually inspect it. The problem here is that research evidence suggests that fungal infection is spread by climber's boots and ropes abrading the limb surfaces and creating entry points for fungal spores.

It was suggested (possibly tongue-in-cheek) that checking by helicopter with a camera attachment could be tried. Never to say no to a challenge we thought "What about a remote controlled mini helicopter?" Thus our Drone project was born.



This is not as far-fetched as it would first seem. The oil industry uses small remote controlled mini helicopters to inspect platform structures and burn off stacks. Railway companies use them to inspect miles of overhead power cables. Consequently, why couldn't Bartlett crews use them in and around tree canopies? The science team at Reading found research had been undertaken using crop surveillance drones, and we discovered a drone pilot in Jon Couling our arborist rep from East Grinstead. We now had an



Water, water everywhere... and not a drop to drink

by Luke Hailey and Dr Glynn Percival

The problem of prolonged flooding has been a topic of national and international importance for the UK and Ireland. While being of major inconvenience for home owners, prolonged flooding also represents a major problem for trees where roots can be submerged underwater for months. There is no doubt that prolonged flooding will have detrimental effects on trees in the spring/summer months. However, with climate change, the instances of intense rain are increasing, meaning occasions of excess flooding will probably increase over the next few years. In many cases villages, towns and cities are ill-equipped to cope with long heavy rains, having insufficient drainage systems and less exposed ground to take up water. Available soils may also be compacted by traffic and pedestrians, further reducing drainage potential. Clay soils are especially liable to flooding.

When soils flood, pores of air become filled up with water. Even after flooding subsides, soil can stay waterlogged for a long period of time afterwards. This means that root systems cannot exchange gases within the soil, an essential part of their function. Once waterlogged, lack of oxygen in the soil changes

the community of bacteria, from healthier aerobic (oxygen requiring) species to anaerobic (non-oxygen requiring) ones. This can be demonstrated by the foul smell when flooded soil is broken open. As this change begins, the original aerobic microbes compete with plant roots for the last of the available oxygen. Once oxygen concentrations drop below 15% roots stop functioning and growing, leading to dieback of the root system. The anaerobic microbes in the soil also produce compounds which can be toxic to the roots increasing damage and causing soil to become more acidic, which changes nutrient availability. This includes a decrease in of the availability of nitrogen, a major plant nutrient essential for growth.

Flooding effects show in tree canopies as leaves yellow, wilt, decay and branches dieback. Dieback and damage to the roots further allows pests and diseases into the tree such as *Phytophthora* root rot. (For more information on this disease see the article on page 2.) The spores of *Phytophthora* actually swim through water in soils, "homing in" on damaged roots. Large scale root damage also affects structural stability and makes trees liable to blowing over, especially in high winds such as the severe ones seen in the past few years.

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Phytophthora Root Rot *by Dr Glynn Percival*

A common question the Bartlett Tree Research Laboratory scientists are being asked is “What will be the impact of all this flooding on tree diseases this year?” Our answer is that there will be a marked increase in *Phytophthora* root rot.

Phytophthora root rot diseases attack the fine absorbing roots of trees and over time can invade the larger roots and root collar. The name *Phytophthora* is a Greek word literally meaning “plant destroyer”. *Phytophthora* root rot is always associated with prolonged flooding conditions. The problem is that the spores of *Phytophthora* are designed to swim through water and are attracted to roots that are in the process of rotting after being submerged under water for a long time period. Symptoms of *Phytophthora* attack include rapid tree death, dead bark and smaller yellow foliage that eventually turns brown. Scattered drops of a rusty-red, yellow-brown or almost black, gummy liquid ooze from small or large patches of bark on stems or limbs.

Phytophthora Management

- Where soils are poorly drained and prone to flooding, use species that are tolerant to these soil conditions.
- Ensure the root collar is exposed and free of soil and mulch. Even species that tolerate poor drainage such as red maple and zelkova are subject to *Phytophthora* when root flares are buried.
- When planting in poorly drained soils create raised beds or provide sub-surface drainage. Plant with the root collar exposed. If soil is compacted, prepare the planting area by cultivating and incorporating organic matter.
- Avoid excessive mulch. A five centimeters maximum mulch depth is recommended. Favour coarse mulches such as bark nuggets or wood chips. Avoid shredded bark products that tend to compact and hold water.

Remedial Treatments

- Fungicide drenches effectively minimise damage from *Phytophthora* root rot if applied at the proper intervals with good coverage. Treating susceptible plants on a preventative basis is recommended. Ask us about treatment and application schedules.
- Improving soil drainage as needed, proper mulching, irrigation and root collar excavation are recommended to reduce the incidence and severity of *Phytophthora* root rot.
- *Phytophthora* sensitive species planted on sites subject to saturated soils may require periodic treatment (annual to biannual).

SHRUBS FOR POORLY DRAINED SOIL

(*Phytophthora* root rot tolerant)

Common Name	Botanical Name
Sarcococca	<i>Sarcococa hookerana</i>
Viburnum species	<i>Viburnum</i> spp.
Inkberry holly	<i>Ilex glabra</i>
Yaupon holly	<i>Ilex vomitoria</i>
Winterberry holly	<i>Ilex verticillata</i>
Chinese witchhazel	<i>Hamamelis virginiana</i>
Butterfly bush	<i>Buddleia davidii</i>
Mockorange	<i>Philadelphus coronarius</i>
Arborvitae	<i>Thuja</i> spp

TREES FOR POORLY DRAINED, CLAY SOILS AND URBAN AREAS

Common Name	Botanical Name
Field Maple	<i>Acer campestre</i>
Red Maple	<i>Acer rubrum</i> *
River Birch	<i>Betula nigra</i> *
Hornbeam	<i>Carpinus betulus</i>
Cockspur Hawthorn	<i>Crateagus crugalli</i>
Leyland Cypress	<i>x Cupressocyparis leylandii</i>
Ash	<i>Fraxinus</i> sp.
Ginkgo	<i>Ginkgo biloba</i>
Thornless Honeylocust	<i>Gleditsia triacanthos ‘inermis’</i>
Sweetgum	<i>Liquidambar styraciflua</i> *
Crabapple	<i>Malus</i> spp. (<i>use disease resistant cultivars</i>)
Metasequoia	<i>Metasequoia glyptostroboides</i>
Blackgum	<i>Nyssa sylvatica</i> *
Norway Spruce	<i>Picea abies</i>
White Spruce	<i>Picea glauca</i>
London Plane	<i>Platanus x acerifolia</i> *
Callery Pear	<i>Pyrus calleryana (use cultivars)</i>
Willow Oak	<i>Quercus phellos</i> *
Japanese Pagodatree	<i>Sophora japonica</i>
Baldcypress	<i>Taxodium distichum</i> *
Arborvitae	<i>Thuja occidentalis</i>
Lacebark Elm	<i>Ulmus parvifolia</i> *
Japanese Zelkova	<i>Zelkova serrata</i>

* *Tolerates temporary flooding*

Examples of the visual signs of *Phytophthora* on a variety of trees.



Water, water everywhere... (continued from p1)

Helping Trees Recover from Flooding Damage

Research at the Bartlett Tree Research Laboratory by Dr Glynn Percival has shown that nitrogen fertilisation can help mitigate some of the stress caused in trees by waterlogging and aid recovery. At Bartlett we use a granular or liquid fertiliser specially formulated for trees and provide scientific soil analysis to tailor fertilise soils and correct its current condition. Our specialised phosphite fertilisation treatments can also improve your trees' defences against pathogens such as *Phytophthora* root rot where required we can also identify soil compaction problems and impaired drainage, rectify them and simultaneously apply soil amendments using air spade technology.



After flooding has subsided, mulches can be applied to soils to promote the return of a healthy microbial community, suppress soil borne diseases and stimulate new root growth.

Recovery from flood conditions involves a multi-tiered approach of care. Your arboriculturist can explain the treatment options fully with you.

It's All Up in the Air (continued from p1)

experienced pilot and reliable science to back up our original idea. We invested in a suitable semi-commercial Quad copter and high quality camera unit which came in several boxes and assembled into a small unit that at first sight was, underwhelming us until it flew and transmitted pictures which proved very clear and high definition. Drone technology is proving to be reasonably easy and on board GPS helps steady and fix the copter if the pilot loses concentration. Flying in, out and around tree canopies are difficult but with practise possible (so far there have been no crashes). Early results from known Massaria infected trees suggest that a photo id of infection is

possible and close up structural inspections relatively easy to perform. At present, trials are on-going to build a body of evidence with which to convince clients and sceptics. Even our insurers are relaxed about our request to insure a Bartlett helicopter, particularly when they realised it was not much bigger than a shoe box! Having had several industrial clients on their books we were not on our own, but we are pretty much the only flyers in the tree world.

Colleagues have suggested we consider assessing infra-red cameras for studying tree vitality, given the positive early day results so far, that is a distinct possibility.

Bartlett's drone camera inspecting the upper branches of a tree for signs of infection.



Tree Related Cryptogram

Code-breakers can decrypt the following message about trees.

“K'Q WKVD LY FY HA IWKPHKXF B HKGIU LGDD, BJQ

IWKPH HWBIV HGBJIUDM RT B MJYE-EUKLD LGRJV

LYEBGQ UDBSDJ, LKWW LUD LGDD IYRWQ HDBG

JY PYGD, HRL CKTTDQ KLM LYT BJQ MDL PD QYEJ

BNBKJ. LUBL EYRWQ HD FYYQ HYL U FYKJF BJQ

IYPKJF HBIV. YJD IYRWQ QY EYGMD LUBJ HD B

MEKJFDG YZ HKGIUDM.”

– Robert Frost, Birch Trees



Check the answers at www.bartlett.com/puzzles or by scanning this QR code with your smartphone.

What's a QR Code?

A type of barcode which you scan with a smart phone to immediately access additional information or a web site. In selected printed material, like *Tree Tips*, we may occasionally include a QR code that will link you to additional information online.

Book Reviews

Britain's Tree Story: The History and Legends of Britain's Ancient Trees
by Julian Hight



Trees have always inspired awe and wonder and some of our ancient trees have been standing for over a thousand years. In this fascinating and lovingly researched book the author selects the most interesting of them and compares archive photographs and engravings with contemporary color photographs. Some of the trees featured have changed drastically over the centuries, while others seem to have hardly changed at all. Many of the trees are still standing and there is a gazetteer in the book of where to see them.



Time Out The Great Trees of London
by Editors of Time Out

In collaboration with Trees for Cities, a tree-planting charity, Time Out presents photographs of 61 trees in London that are considered to be “Great Trees.” Among them are the Greenwich Park Shagbark Hickory, which is perhaps the largest of its kind in the country, and the Marble Hill Black Walnut, with its unusual pitch-black bark. Some incredibly venerable trees appear as well, such as the Charlton House Mulberry, planted at the request of James I at the turn of the 17th century, and the Richmond Royal Oak, which is estimated to be 750 years old. Each tree is accompanied by a 500-word description, glorious colour photographs taken in various seasons, and details of its exact location and how to get there by public transport.

The Complete Book of Trees of Britain and Europe
by Tony Russell



The ultimate reference guide and identifier to 550 of the most spectacular, best-loved and unusual trees, with 1600 specially commissioned illustrations, photographs and maps.

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The Electrostatic Sprayer Proves an Interesting and Effective New Tool for Tree Health Care

by Ian Barrow, General Manager

Don't let it be said that we do not respond to challenges set by our clients. In the last few months we have picked up the gauntlet to provide some novel and innovative solutions that will improve our service. In addition to our "drone" project described on page one, we have also researched a better method of spraying in answer to requests we have received.

The company had been investigating and evaluating low volume hydrostatic spray systems but was not satisfied with the results at the time. Then, we found technology that would suit our needs and our clients. Electrostatic sprayers work on the basis that trees are negatively charged as they are "earthed" to the ground. Consequently if sprays are artificially positively charged the water particles within them "stick" to negatively charged trees and shrubs. No big cables, high power outputs are required. The mouth of the cannon outlet emits a micro charge which the liquid droplets pick up (remember the Van de Graaff generator in school science), and the natural background negative charge of earthed plants and trees do the rest!

Last year's Forestry Commission (FC) Oak Processionary Moth (OPM) treatment programme required a timely solution from us and was an opportunity to develop a new tool. Close to 20,000 mature oak trees were sprayed in urban and suburban areas of South and West London. This gave us the opportunity to test our research in the field under real circumstances. The job was completed successfully. We used eight of our plant health spray rigs from offices throughout the UK.

The challenge in spring and summer is to treat trees with substantially less volume of liquid carrier for the active chemicals applied in densely populated residential areas, increasing the accuracy of coverage. And sometimes we must provide off road service for large groups of parkland oak trees.

Training of Bartlett operators is underway at present. We have quickly realised the opportunities for fruit tree and orchard treatments, vineyard spraying, and large scale fungicide applications for our clients' properties. Anthracnose of Plane and Willows is also a problem in the UK; all the more so with the present exceptional wet weather. We now have another tool that keeps Bartlett at the forefront of plant health care in the UK and Ireland.



Positively charged water particles from electrostatic sprayer 'stick' to negatively charged trees and shrubs.



One of Bartlett's electrostatic sprayers in action – these new tools use less water and provide increased accuracy.

Compliments of



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