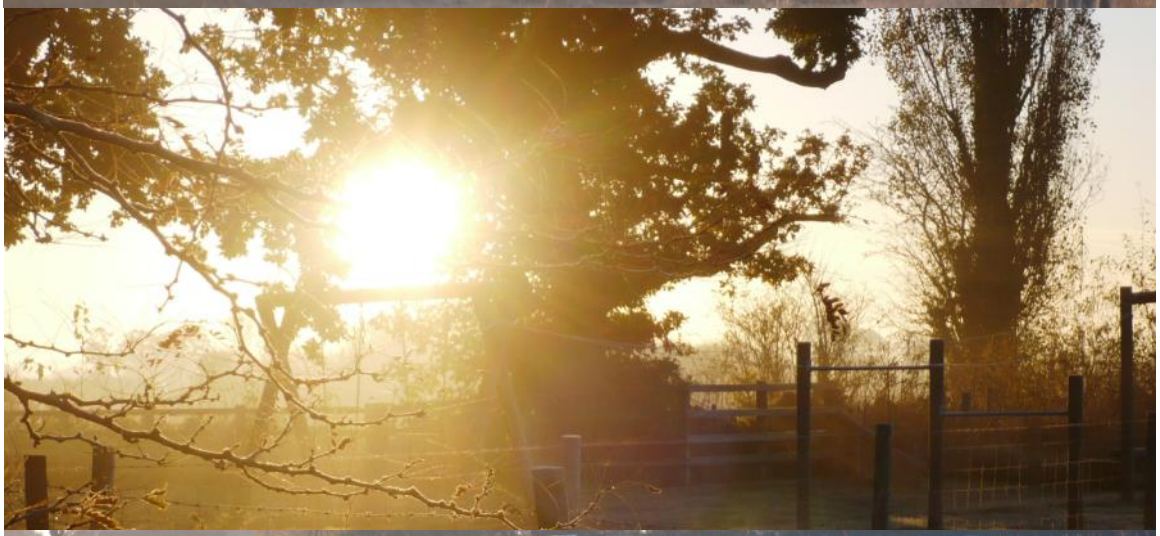
The Acorn Autumn/Winter 2012



Cheshire Landscape Trust

• The Acorn Autumn/Winter 2012 •

celebrating 30 years Cheshire Landscape Trust

SCORELINE

138 Parishes 181 Tree Wardens

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Musings from my tree

Many of you will have already heard the sad news about Tony Gentil passing away. Tony was well known to many of the Cheshire Tree Wardens having been an expert source of information on all things 'apple and orchard' for many years. He worked in partnership with Cheshire Landscape Trust for many years on the provision of fruit trees for your orchards, led on our orchard management workshops at Norton Priory too and was, with his wife Liz, the driving force behind our Cheshire Gooseberry Project. He will be sadly missed.

The poem 'Trees' by Joyce Kilmer, was read at Tony's celebration service in September and was one of his favourites.

TREES
by: Joyce Kilmer (1886-1918)

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;

A tree that looks at God all day,
And lifts her leafy arms to pray;

A tree that may in Summer wear
A nest of robins in her hair;

Upon whose bosom snow has lain;
Who intimately lives with rain.

Poems are made by fools like me,
But only God can make a tree.

The tree planting season is fast approaching and you should have all have received a list of trees we have available and a Tree Order Form. If not, they are available on our website or just give the office a ring. Once you have returned your order forms I'll be in touch with dates when we'll be at the nursery for tree collection. We start at the end of November during National Tree Week.

Several of you have already become involved in our new project called Landscape Wardens, which is funded through the Big Lottery Fund. This is building on over 20 years of the Tree Warden scheme and we hope to train people to be the 'eyes and ears' of landscape on their patch. We are focussing on two contrasting areas of Cheshire to begin with, namely Ellesmere Port and Broxton district and have already held events in both these places. Keep an eye out on our website's newspage for details of up and coming workshops.

Here at the Trust we continue to work closely with Norton Priory Museum. We joined them for a very successful Apple Day this October and will be working with them on another new project on traditional skills. Between us we will be running a series of events throughout 2013 on a variety of activities from fruit tree pruning and grafting, hedge laying, candle, basket and hurdle making and even falconry. To book a place on any of these events contact Norton Priory on 01928 569895.

Katie Lowe
Cheshire Landscape Trust

Landscape Wardens Project

During 2012 Cheshire Landscape Trust was awarded a grant from the Big Lottery Fund's 'Awards For All' programme for a new project called Landscape Wardens.

The aims of the Landscape Wardens project are:

- To establish a group of trained volunteers actively engaged in surveying, reporting and improving their local landscape.
- To have Landscape Wardens as the 'eyes and ears' of Parish and Town Councils in relation to the condition of the landscape and local environment.
- To encourage people to learn about and become involved in the planning and management of the landscape through volunteering.
- To improve the understanding and management of the local landscape by providing training opportunities.
- Support existing landscape planning and management strategies whilst seeking to promote, develop and sustain the principles contained in the European Landscape Convention through good practice for the conservation and enhancement of the landscape.
- Help to deliver Local Landscape Strategies and Local Area Agreements.
- To address the existing lack of capacity amongst Parish and Town Councils to identify landscape problems in an objective way and deal with them in a positive manner.

So far we have held 5 events including a session on the landscape character of Ellesmere Port and a workshop on recording the natural environment. More sessions will follow including one on historical landscapes and, due to high demand, another landscape character session, this time focussing on Broxton area.

Many of our Tree Wardens have taken part and we hope this will continue with our future Landscape Warden events. Keep an eye out on the news page of our website for details of up and coming events.

Next Landscape Wardens Event

Landscape Character at Bickerton Village Hall on Sunday 2nd December from 10am – 3pm

Calendar of Events 2013

Tuesday 15th January and Sunday 20th January

Fruit Tree Pruning

10am – 1pm, £25 per person

Learn the theory behind pruning your orchard trees then have a go yourself.

Tuesday 19th February and Sunday 24th February

Fruit Tree Grafting

10am – 1pm, £25 per person (includes 2 grafted trees to take home)

Learn the theory behind grafting fruit trees and have a go yourself.

To book any event please contact Norton Priory on 01928 569895

A Cheshire Landscape Trust and Norton Priory project

Fenland Black Oak

5,000-year-old tree found in Norfolk

The trunk of a giant oak tree, thought by experts to be more than 5,000 years old, has been unearthed in a field in Norfolk.

The 44ft (13.4m) Fenland Black Oak, or bog oak, was found buried in farmland at Methwold Hythe, near Downham Market.

Planks cut from the trunk will be dried over seven months in a specialist kiln. A spokesman said the tree would make "a breathtaking table for public display giving an insight into the grandeur of these ancient giant forests".

Bog oak is generally found buried in farmland. One of the rarest forms of timber in England, when dry it is said to be "comparable to some of the world's most expensive tropical hardwoods".

Experts believe the Norfolk bog oak is "the largest-ever intact 5,000-year-old sub-fossilised trunk of an ancient giant oak", but think it could be just a section - possibly as small as a quarter - of the original tree.

Standing trees began to perish as water levels gradually rose starting about 7,000 years ago and when they died they tumbled into silt that built up on the forest floor and this led to their preservation.

Hamish Low, of specialists Adamson and Low, said: "This one is so special in that it is intact and, as far as I can tell, sound along its full 44ft length. Along with the fact it is impossible to know how long Fenland Black Oaks will continue to rise out of the soil, and their inherent fragility, this one is worthy of preserving for the interest of the nation."

Having taken a team of experts a day on Tuesday to unearth the tree and mill on site to 10 planks, the wood is being transported to London for drying.

Working as the Diamond Jubilee Fenland Black Oak Project, Mr Low will lead a team of apprentice carpenters, in collaboration with the Worshipful Company of Carpenters, to create a 44ft table from the dried oak with the intention of putting it on show to the public.

"Most people in the woodwork business will think it's a ridiculous thing to try and attempt, but they are digging up less and less bog oak and there is very little of it on public display," said Mr Low. "It's only by developing techniques over 20 years we've even dared to try and attempt this."

Taken from http://www.bbc.co.uk/news/uk-england-norfolk-19722595 on 26 September 2012 Author not acknowledged

Just add trees

How greening concrete jungles will help us adapt to a warming world

People crowd together under umbrellas at Ogbette market in the Nigerian city of Enugu in an attempt to hide from the heat, which can reach a sweltering 39 degrees Celsius. But follow the three-wheeled *keke napep* motorcycles out of the city centre, and you'll find the natural environment a much more pleasant temperature of 29 degrees Celsius.

The obsession with replacing real jungles with those of the concrete persuasion has seen temperatures in cities rise formidably, creating what scientists term 'urban heat islands'.

And the lack of greenery in city centres has important implications for the way urbanites are able to cope with the challenges of a warming world, said Emilia Pramova, a climate change adaptation scientist with the Center for International Forestry Research and co-author of a presentation delivered at the World Conservation Congress in Jeju, South Korea last week.

"Urban development often replaces vegetated surfaces — which provide shading, cooling, rainwater interception, storage and infiltration functions — with impervious built surfaces that are not capable of providing any of these services," she said.

According to a UN report released in 2007, over half of the world's population now live in cities such as Enugu. Africa is projected to more than double its population by 2050 to 1.9 billion, most of which is expected to occur in poverty-stricken sub-Saharan Africa. While still predominantly rural, much of the continent's coming growth will be in urban areas, having significant implications for city planners and policymakers.

Studies of Enugu's urban situation recommend a 50 percent increase in residential tree cover, however planting just ten percent more trees in town centres dominated by concrete such as in the UK city of Manchester has been found to decrease surface temperatures by over 2˚C and reduce excess water flow from heavy rains by up to six percent.

But, as Pramova points out, studies on urban ecosystems in general have mostly focused on developed countries. Planting just ten percent more trees in town centres dominated by concrete … has been found to decrease surface temperatures by over 2˚C "Research on forests in urban adaptation to climate variability in developing countries is still in its infancy," she said.

"Urban centres in developing countries face more complex challenges as many of them lack adequate "grey" infrastructure (e.g. bridges, sewage systems) and have big proportions of their population living in slums and other high-risk areas that are disaster-prone and ill equipped for adaptation. They face multiple hazards and risks and multiple measures will be needed in addition to green strategies."

Further hampering progress is the high cost of creating large new green spaces in many existing urban areas. Thus, policymakers would have to make the most of all opportunities, considering everything from roof gardens and street tree planting to converting selected streets into green corridors.

Urban greening initiatives could also be linked to mitigation policies such as reduced energy consumption for cooling and sectoral programmes that can provide partial funding.

However strategies to manage climatic changes in urban areas should also consider 'ecological networking' to utilise the important role of forests in other regions and also strengthen biological corridors.

"We are starting to see green systems developing. In Beijing, for example they are proposing an ecosystem based strategy where regions (natural forest maintenance), cities (parks and green corridors) and neighbourhoods (road greening) are all participating to enhance overall benefits," Pramova said.

Taken from http://blog.cifor.org on 10th September 2012 written by Michelle Kovacevic

Wiltshire oak tree declared UK's tallest

A 200-year-old tree on a Wiltshire estate has been officially declared the tallest oak in the UK. The 132.5ft (40.4m) English oak, in the grounds of the National Trust Stourhead estate, was measured by an expert on behalf of The Tree Register charity.

Standing in a clump of tall oaks, the tree's growth has been put down to rich soil and its need to compete for light. Alan Power, estate manager at Stourhead, said having the tallest oak in the country was "very special".

The champion tree, on the 2,650-acre estate, stands on a sheltered slope surrounded by a clump of six very tall old oak trees. But unlike other long-lived slow-growing oaks, it is tall and slim, with a trunk circumference of just over three metres.

'Excellent' soil

"This type of oak tends to grow short and stumpy but [being] surrounded by other trees has encouraged this one to push up for the light and grow much taller," said Mr Power. "It is also in a natural, mixed woodland where the soil is excellent with a good amount of leaf mould, which helps retain the moisture so it never dries out, even in a drought. We don't know if it was planted deliberately or whether it just grew naturally. But we are really fortunate that we have a number of exotic champion trees at Stourhead and to now have a native champion tree is very special."

The tree was believed to be a possible champion after it was measured by laser by a representative of the European Champion Tree Forum in July. But the fully verified measurement, which requires the tree to be physically scaled and a tape measure dropped to the ground, was carried out by professional tree climber Waldo Etherington.

The oak is the first native champion to have been recognised in the National Trust estate gardens. And David Alderman, from the Tree Register of the British Isles, said "crowning a new champion tree" was "very exciting news". "In other parts of Europe they reach up to 43 to 44 metres but that's about their limit," he said. "This is exceptionally tall for an oak tree, not just in the UK but in northern Europe."

Taken from bbc.co.uk on 29th August 2012

Does Ivy kill trees?

At a recent talk I gave I was once again asked the question "What can we do about all the ivy killing trees?" This question keeps coming up time and time again and I keep giving the same answer – ivy does not kill trees! The article below was produced by the Tree Advice Trust in 1996 and we have printed it in The Acorn before but the same advice still applies. Spread the word!

http://www.treehelp.info/tree-damage-alerts/154-tda-no29-it-wont-choke-you

Katie Lowe
Chief Executive
Cheshire Landscape Trust
(see overleaf for full article)

Chalara dieback of ash (Chalara fraxinea)

Chalara dieback of ash is a serious disease of ash trees caused by a fungus called Chalara fraxinea (C. fraxinea). The disease causes leaf loss and crown dieback in affected trees, and it can lead to tree death.

Ash trees suffering from symptoms likely to be caused by C. fraxinea have been found widely across Europe. These have included forest trees, trees in urban areas such as parks and gardens, and also young trees in nurseries.

In February 2012 it was found in a consignment of infected trees sent from a nursery in the Netherlands to a nursery in Buckinghamshire, England. In June 2012 it was found in ash trees planted at a car park in Leicestershire which had been supplied by a nursery in Lincolnshire, and the origins of the disease in this case are being investigated. In July 2012 our colleagues in the Food & Environment Research Agency (Fera) confirmed cases in the nursery trade in West and South Yorkshire and Surrey, and by September 2012 it had been reported in a nursery in Cambridgeshire.

It has also been found at four recently planted sites - a Forestry Commission Scotland woodland at Knockmountain, near Kilmacolm, west of Glasgow; the car park in Leicester, a college campus in South Yorkshire, and a property in County Durham.

However, the disease has not yet been found in the natural or wider environment in Great Britain, that is, outside nurseries and recent plantings. C. fraxinea is being treated as a quarantine pest under national emergency measures, and it is important that suspected cases of the disease are reported.

Pest risk assessment consultation launched
A Pest Risk Assessment (PRA) on C. fraxinea has been published, and a formal consultation on its management has been launched by Fera. Comments may sent to Fera until 26 October 2012. To read the PRA and find out about the consultation, visit the plant pests and diseases consultation pages of the Fera website.

Symptoms
Our Forest Research agency has produced a practical pictorial guide to recognising the main symptoms, and an exotic pest alert which gives more information about the disease (this can be found if you use the web link below)

Reporting suspected cases

Please report suspected cases of the disease to one of the following:

Forest Research Tree Health Diagnostic and Advisory Service	Forestry Commission Plant Health Service	Fera Plant Health and Seeds Inspectorate
T: 01420 23000;	T: 0131 314 6414;	T: 01904 465625;
E: ddas.ah@forestry.gsi.gov.uk	E: plant.health@forestry.gsi.gov.uk	E: planthealth.info@fera.gsi.gov.uk

Taken from the Forestry commission website http://www.forestry.gov.uk/chalara

It won't choke you!

Tree Damage Alert No 29 7 December 1996

It won't choke you

As the trees become bare of leaves once again, ivy gets notice and, as people seem to have a need to worry about trees, their worry turns to ivy. This is often reinforced by ill-informed press article and ivy gets it in the neck (or stem-base) again.

Two words constantly recur in the demonology of ivy: strangling parasite. Some plants do strangle – in the tropics there are strangling figs and strangling vines that clamber up forest trees and then repay their supporters by killing them. In very exceptional cases, ivy might strangle the odd branch (we've never seen a case though we have heard of it happening once or twice) but **there is no significant risk of it strangling a tree**. As to parasitism, in Britain we have 2 rather weird, but quite rare, little parasitic climbing plants called greater dodder or common dodder. They plug their suckers into the plants they scramble up (quite a wide range going up in size to gorse, but not trees) and feed off them. **Ivy is not parasitic**.

Off the wall. Ivy is not all sweetness and light, however. It is certainly not good news for poorly maintained stone – or brickwork. The anchoring roots will cause physical damage as they work their way into cracks and soft old mortar. Weakened walls can even be pulled down by the weight of ivy. In the same way a dead, rotting tree with ivy on it will probably break up and fall down more quickly than one without. But, ivy roots can't do biological damage. Natural crevices in the non-living outer bark are are as far as they get and they lengthen at the base to accommodate the growth in diameter of wood and bark.

Off the tree. The nails that hold up the car-boot sale and coffee morning notices on convenient trees are more injurious that ivy roots. And, to really strangle a tree, the old country pastime of using the trunk as a ready-made fence-post and wrapping wire round it can be extremely effective. Forgotten tree ties can do the same job. Sometimes they slither down to ground level when the tee is still young and slender and get hidden in the grass and debris at the bottom – out of sight, out of mind. If the tree survives and, like the authors, gets middle-aged and fat, the noose tightens with fatal consequences.
But- play it again Sam- **ivy doesn't do this!**

On the tree. We are not qualified to pronounce on aesthetics. If you think that an ivy-covered tree is unsightly we won't argue - though we do suggest that a tree covered with dead ivy won't look any better. What is unarguable is that the ivy covering on trees is a haven for wildlife. Insects, birds and even small mammals live in it and rely on it for shelter and food – the berries in particular are an extremely important winter food-source. To use a very in-vogue term, an ivy-covered tree is an ecosystem, and one that our woods, parks and gardens would be much the poorer without.

It's conceivable that ivy on trees can be a problem. A thick covering certainly hampers tree inspection and, more seriously, it is sometimes alleged that the extra weight in winter could tip trees over that would otherwise have stayed upright. There is no evidence for this but the possibility is difficult to rule out completely. If the tree is in so precarious a state, however, it would be difficult to justify stopping at stripping off the ivy.
Christmas is coming. The green plants of the northern European winter, holly, mistletoe (this *is* semi-parasite) and ivy, are deeply embedded in our culture and none of them deserves the slander that ivy seems to attract. Although only a relatively recent arrival from the Mediterranean, Christianity was sensible enough to respect these traditions. At this time of year we sing "Of all the trees that are in the wood, the holly bears the crown"- but ivy is up there with it in the first line. So leave it alone!

References

Mayle, B.A. (1992). Bats and trees. *Arboriculture Research Note 89/92/WILD*. AAIS Farnham Surrey

Steve Gregory, Forestry Commission Northern Research Station, Roslin, Midlothian, EH25 95Y
Derek Patch, AAIS Alice Holt Lodge, Wrecclesham, Farnham Surrey. GU10 4LH
Richard Ferris-Kaan, Forestry Research Centre Alice Holt Lodge, Wrecclesham Farnham, Surrey GU10 4LH

This is one of the occasional series of Tree Damage Alerts produced for the benefit of the Arboricultural profession by the Forestry Commission under the auspices of the Department of the Environment, and issued by the Arboricultural

Unprecedented threat' for UK trees from pests

UK trees are facing an "unprecedented level of threat" from pests and diseases, the Forestry Commission has warned. All species are vulnerable to potential attacks - from ecologically vital oaks to non-native ornamental species, such as lawson cypresses. The biggest risk, it warns, comes from non-native organisms, which - in their natural range - are kept in check by natural predators and environmental conditions. However, if they are able to become established in the UK's natural environment then there are often no natural controls to curb their spread, resulting in a potentially devastating impact on the landscape.

In October 2011, UK Environment Secretary Caroline Spelman launched the Tree Health and Plant Biosecurity Action Plan, warning that millions of trees could be lost in the next few years unless urgent action was taken. The Commission recently published biosecurity guidance, offering advice on steps that can be taken to avoid accidentally spreading damaging organisms on clothes, footwear, vehicles, etc. "The fact that we are an island has helped us, because we are fairly impoverished compared with the European mainland," explained Hugh Evans, head of Forest Research in Wales. "So even the 20 miles of water is enough to protect us from the pests that are quite dangerous on the mainland." But our relative isolation has come at a cost, he warned. "If pests do get through, then they arrive without the spectrum of natural enemies and that is one element that can make the effect within the arrival country much worse than in the country of origin."

Growing trade

Richard McIntosh from Food and Environment Research Agency (Fera) says the growing volume of international trade is one reason for concern. "Trade is becoming increasingly global, and there is an ever -widening diversity of plants and plant material being traded around the world," he told BBC News. "There are examples of where pests or pathogens have been introduced, and it is very difficult to respond to them once they are within the EU. "Prevention is much better than cure but identifying all of the risks is not always the easiest thing to do."

Growing trade

Richard McIntosh from Food and Environment Research Agency (Fera) says the growing volume of international trade is one reason for concern. "Trade is becoming increasingly global, and there is an ever -widening diversity of plants and plant material being traded around the world," he told BBC News. "There are examples of where pests or pathogens have been introduced, and it is very difficult to respond to them once they are within the EU. "Prevention is much better than cure but identifying all of the risks is not always the easiest thing to do."

Probably the most widely publicised pathogen is Phytophthora ramorum, a fungal organism which was suspected of being introduced to these shores via the plant trade. There is no treatment; infected trees have to be felled and removed from the natural environment. Although it had been present at low levels in the UK for a number of years, in 2009 there was a sudden change in the pathogen's behaviour. It was recorded infecting and killing the commercially important Japanese larch trees in South-West England. It was the first time in the world that P. ramorum had been found on a species of conifer. It has since been recorded affecting larch trees at sites in all four UK nations.

John Morgan, head of the Forestry Commission's Plant Health Service observed: "We are still are pursuing a policy of reducing the level of the disease so then it does not spread further."If, over a number of years of felling, we can reduce its spread we can then preserve what we have left in terms of larch in forests." Dr Morgan added that the disease would not be eradicated: "Once something like that is established then we are purely looking at a policy of containment. "P. ramorum is definitely in the realms of containment strategies. By the time it was discovered in larches, it was too late." Experts say the symptoms to look out for on larch trees include dead and partially flushed trees present in groups, patches or distributed throughout a stand. An affected tree's crown and branches die back, and there is a distinctive yellowing or ginger colour beneath the bark.

Contd on the next page

Unprecedented threat' for UK trees from pests

Unwelcomed guests

Another pest that was introduced to the UK as a result of human activity was the great spruce bark beetle."It clearly came into this country via wood that had not been debarked properly," said Prof Evans. "What was interesting - and I think this is [a] somewhat typical story - is that although we found it in 1982, our subsequent research found that it had been in the country at least 10 years prior to that."The beetle breeds under the bark and destroys the cambium (a layer of growing tissue that produces new cells to carry water, sugars and nutrients around the tree). This weakens the tree, and in most extreme cases, the damage can kill the tree. As part of their research, Prof Evans said scientists quickly identified a possible "bio-control" option.

They introduced a natural predator - another species of beetle called Rhizophagus grandis. "We were able to bring that beetle in to the country; we got the very first licence for the release of a non-native species under the Wildlife and Countryside Act. "It proved to be incredibly successful," he told BBC News. "[The great spruce bark beetle] did kill quite a few trees, but after the predator was introduced and we continued to monitor it for a few years, its population has dropped to a relatively low level. It is still spreading, but the predator seems to be following it."

Preventing pests

Dr Morgan said UK control measures involved four stages. "We try to prevent pest and diseases entering the country; then, if they have arrived, we switch to a policy of eradication to try and stop them becoming established," he said. "If they do become established then we try and follow a policy of containment which is to try and slow or stop the spread of the pest. Finally, if all previous three efforts have failed then we operate a way that we can live with the particular pest or disease."

There are a number of ways that scientists are able track the global or regional spread of a pest or pathogen, such as the EU Plant Health Directive that requires nations to report new outbreaks or new pathogens. Another way data is shared among researchers is via bodies such as the European Mediterranean Plant Protection Organization and the International Plant Protection Convention. "Both of these organisations have notification systems where countries are able to report developments that might be of wider interest," revealed Fera's Richard McIntosh."We monitor that sort of intelligence, together with information that might be coming out via publications, and also what we are finding - such as what we are intercepting at the national borders." Mr McIntosh said this information is used to produce a document known as a Pest Risk Analysis (PRA), which looks at the risks, possible impacts and control of each organism within a UK context.

Wider impact

Andrew Sharkey, head of woodland management for the Woodland Trust, said the impact of pests and diseases often had ramifications that were felt beyond the individual trees that were infected. "Two of our sites have been affect by [Phytophthora ramorum]... so we had to fell the larch on those sites," he said. "We are comfortable with this because it is good practice but it means that it has disrupted all of the site plans for those sites. "The larches on one of the sites were on what we call 'planted ancient woodlands', which we were trying to restore back to native woodlands. "This has an immediate impact on our biodiversity work and planning work."

In 2011, Natural England's Keith Kirby warned that the future well-being of the UK's oak trees was at a crossroads because of the potential threat from a disease known as Acute Oak Decline (AOD), which experts warned could be as devastating to the treescape as Dutch elm disease. Dr Kirby told BBC News that research was helping shed more light on dynamics of the mysterious disease. "We are becoming more and more certain that it is basically a bacterial issue, and a beetle is involved in its spread. It appears that the problem is also exacerbated if the tree is under stress," he said. "But we are not that much further along in terms of knowing exactly how abundant or widespread it is. "At the moment, it does not look as if it has gone beyond the East Midlands and southern England area, where most of the records have come from."

As one of the UK's leading woodland ecologists, Dr Kirby said people had to be philosophical about the fact that the composition of woodlands were going to change. "We cannot attempt to maintain the mixtures that existed in the past," he observed. "We have to accept that there will be change, and manage the dynamic situation. If you have got a changing environment, you cannot expect the communities and assemblages of species of past environments to survive."

By Mark Kinver Environment reporter, BBC News, 3rd September 2012

Tree rings reveal Amazon's rainfall history

Samples from eight cedar trees in Bolivia have helped shed light on the seasonal rainfall in the Amazon basin over the past century, say researchers. A study led by UK-based scientists said the data from the trees provided a key tool to assess the natural variation in the region's climate system.

It suggested that tree-rings from lowland tropical cedar provided a natural archive of rainfall data. The findings appear in the Proceedings of the National Academy of Sciences. "Climate models vary widely in their predictions for the Amazon, and we still do not know whether the Amazon will become wetter or dryer in a warmer world," said co-author Manuel Gloor from the University of Leeds. "We discovered a very powerful tool to look back into the past, which allowed us to better understand the magnitude of natural variability of the system."

The researchers explained that the region's vast size and position on the equator, the response of the forested area's hydrological cycle "may significantly affect the magnitude and speed of climate change for the entire globe". Dr Gloor added: "In a similar way that annual layers in polar ice sheets have been used to study past temperatures, we are now able to use tree rings of these species as a natural archive for precipitation over the Amazon basin."

Wooden signal

The team identified the signal in measurements of two different forms (or isotopes) of oxygen within the wood of *Cedrela odorata*. Within tropical and sub-tropical evergreen rainforests, trees' growth rings are less pronounced than in other woodlands - such as temperate regions - as there is no discernable dry season and temperature variations are minimal.

But lead author Roel Brienen, from the University's School of Geography, explained: "We already knew that some tropical tree species form annual rings and we also anticipated that the isotopic signature in these rings might record changes in the climate. "What surprised us, however, is that just eight trees from one single site actually told us how much it rained not just at that site but over the entire Amazon catchment," Dr Brienen added. "The isotopic values recorded in the tree rings were very closely related to annual variation in the river levels of the Amazon, and thus the amount of rainfall that flowed into the oceans."

The researchers added that about 17% of the annual discharge from rivers into the world's oceans comes from the Amazon. Also, they said, the basin's hydrological cycle is closely tied to the carbon cycle of the rainforest, which is one of the planet's largest terrestrial biomass carbon pools.

The cedar species used in the study has shallow roots, therefore they are more dependent on water they are able to gather from rainfall that gathers in topsoil. Dr Brienen observed: "The record is so sensitive, we can say what year we are looking at. "For example, the extreme El Nino year of 1925-26, which caused very low river levels, clearly stands out in the record." Until now, reliable meteorological data in the region was scarce and only stretched back over the past 50-60 years.

By Mark Kinver Environment reporter, BBC News 2nd October