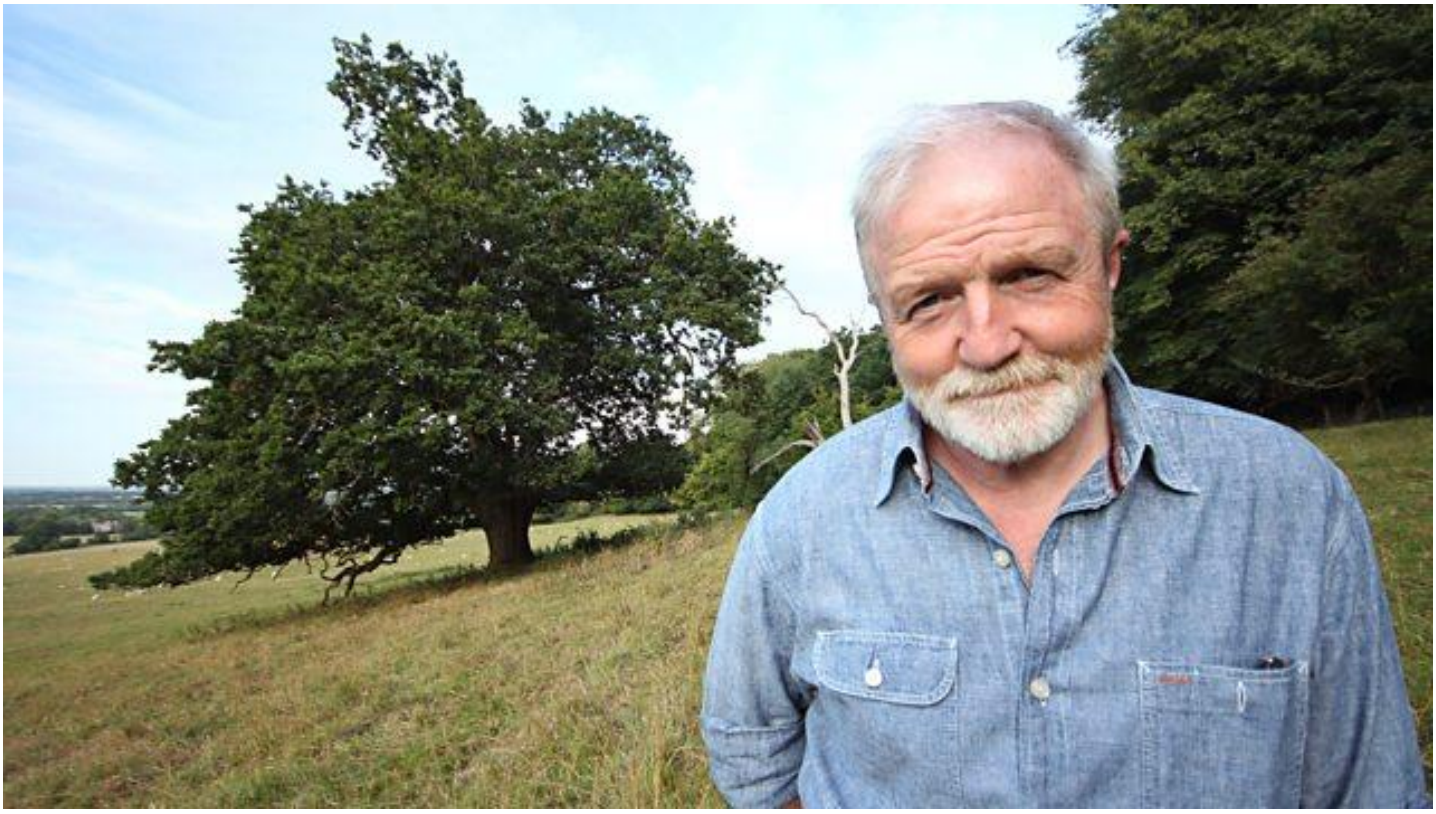

A YEAR IN THE LIFE OF A TREE

In early October 2015, BBC4 screened a 90-minute documentary capturing every aspect of life in an ancient English oak – there are many examples on the Temple Course – over an entire year 'Oak Tree: Nature's Greatest Survivor' focuses on a single tree in Wytham Woods, just outside Oxford, a site acquired by Oxford University in 1942 for woodland research. The film, presented by zoologist, entomologist and broadcaster George McGavin, opens with a high-tech assessment of the tree's condition. By firing laser pulses, forestry scientists create a 3-D virtual image of the oak so they can track its size and shape over the 12 months.

At the outset, in late August, it's 19 metres tall and 30 metres wide and carries an estimated 700,000 leaves. Its roots spread up to 30 metres from the trunk and a digital scan in mid-January shows it weighs almost 10 tonnes.

As the days shorten and the temperature drops – the oak, nearly 400 years old, has to make what McGavin calls 'a colossal redistribution of its resources' – the first of four seasonal transformations it needs to survive. 'Driven by hormonal signals, trees begin to break down pigments and nutrients in their leaves to store over the winter,' he says; these produce spectacular autumn colours.

Once the nutrients are extracted, the leaves are shed. But leaf drop isn't triggered by cold weather. The oak can in fact sense red light in the spectrum using a chemical pigment (the phytochrome system) in the leaf cells which allows it to measure the hours of daylight. By October, when the oak is releasing acorns, there are six hours less sunlight every day than at the summer peak.

In winter – the oak's 'most perilous season' – the bare tree needs to stay alive in extreme cold, using almost no energy. The bark acts like a blanket, but if the liquids inside the oak were ever to freeze solid the tree would suffer catastrophic damage. So it withdraws fluid from the cells, dehydrating itself. The remaining liquid has a high concentration of sugars – 'a kind of antifreeze', according to McGavin.

Oak beside Temple's 14th green

Most nutrients are stored in the oak's roots over the winter months. But the root system alone isn't enough to extract vital minerals from the soil. The oak also needs 'a vast army of microscopic filaments' to survive, including mycorrhizal fungi to extract phosphate from the surrounding soil.

Springtime brings an 'epic growth spurt' and by late April catkins – the male flowers – emerge. Packed with pollen grains, they're dispersed by the wind to fertilise the female flowers and create the acorns that will continue the oak's life cycle.

A month later the oak is in full leaf and colonised by insects. Among them is the winter moth larva, which eats up to 27,000 times its own weight in young oak leaves. The oak can recognise chemicals in the creature's saliva and defends itself by producing phenolics and tannins to hinder the larva's growth.

Meanwhile gall wasps lay their eggs in the female flowers, inducing galls to grow in place of the acorns. These are where the wasp grub develops. There are hundreds of species of these wasps, each with their own distinctive gall structure. One of these galls – a sphere made by the Andricus collari wasp – makes indelible ink when it's crushed and mixed with water, iron sulphate and gum arabic. Gall ink was used in historic documents for 1,400 years until the 19th century.

An English Oak coming into flower in spring

Oak was a vital building material too in earlier times. 13th-century masons used 2,641 tonnes of oak to build Salisbury Cathedral, felled in spring 1222. The timber came from Ireland as well as England, although English oak, with its wide bands of earlywood, was preferred to the tighter-ringed Irish wood for its lightness and strength. And in the 18th and 19th century there was a frenzy of oak planting in Britain to supply the timber for the navy's warships. It took 6,000 oaks to make HMS Victory – 'a product of mediaeval acorns that dropped all over Britain'. The curved boughs of oak trees were especially useful for creating the shaped hulls.

By August of the second year, the 3-D image shows the oak has created 230 kg of new wood in 12 months, forged from the carbon dioxide (and water) absorbed during photosynthesis. It has also released 234,000 litres of oxygen into the atmosphere from the leaf stomata.

Source: www.woodlands.co.uk/blog/flora-and-fauna/the-life-cycle-of-an-oak-tree/

WOODLAND TRUST on tree thinning

It's important that as the guardians of thousands of acres of green space, the land is managed effectively to ensure it is kept in the best possible condition for people to use and enjoy now and in the future.

Tree thinning is key to this. While you might think that cutting down trees is a bad idea, it's vital for ensuring remaining trees and the shrubs and wild flowers beneath them are strong and healthy.

What is thinning?

Tree thinning is the process of removing certain trees (often weaker or badly formed trees) from a wooded area, with the overall aim of creating a well-spaced and structured woodland using a diversity of healthy, well-formed trees that have the space to develop and grow further.

Why do you need to thin trees?

Trees, shrubs and plants are often planted at high densities, often using fast-growing species to create an instant green landscape. Although achieving the objective of quickly 'greening' the area. The tightness of planting was unsustainable over a long period of time as the trees grow and compete for light. As the trees continue to grow, thinning is essential to ensure the remaining trees have enough space and light to thrive.

While for those looking in it might not seem a positive thing to be doing, if thinning is not undertaken these trees that are artificially close to one another then compete against each other for the available light and become thin and spindly with no relative stem strength, as they put all their growing energies into going skywards. Eventually they are prone to blowing over or snapping, or as they get stressed become diseased.

How do you decide what trees to thin?

It's a very careful process to identify which trees will be removed, and which will remain. The number of trees removed depends on the type of tree and the density of the planting. We try to retain healthy and well-formed trees in a diversity of species, so we are not relying on one trees species, which could then be vulnerable to pests and disease. This process and its results will be carefully monitored to ensure the best results. It can be repeated over many years until the trees mature and their growth slows down.

What about the wildlife?

All the work is expertly timed to ensure it has the least possible impact on the wildlife and other park users. For this reason, tree thinning is carried out in the winter so it doesn't affect wildlife and bird breeding seasons. By thinning out the upper canopy trees it also allows light into the plantation floor which enables the shrubs and ground vegetation beneath to grow, which further helps create wildlife habitat such as feeding (e.g. insects and berries) and nesting opportunities.

Ivy on Trees – Is it a problem?

This must be one of the most common questions we are asked by woodland owners. Ivy (**hedera helix**) is a native plant which requires plenty of light to climb up a tree trunk so it is most commonly found on hedgerow trees, where there is plenty of side light and on dying trees where the canopy is thinning out allowing more light through.

Ivy is also a ground cover plant of secondary woods but is less dominant in ancient woods. Ivy is a very valuable habitat for wildlife. It is a late flowering plant which bees and other insects visit in autumn, while its berries (poisonous to humans) are eaten by over-wintering birds, particularly thrushes. Its intertwined stems and evergreen foliage make it an excellent nesting site for small birds, a hiding place for insects and a summer roost for bats. The shape and colour of the Brimstone butterfly mimic that of an ivy leaf. The holly blue butterfly has two generations of caterpillars a year: the first brood feeds on holly flowers in the spring and the second on ivy buds during summer.

Ivy is not a parasite; it takes nothing from the tree and only uses it for support. It does not strangle the tree or cause deformities (which the wild clematis does). Occasionally, when it gets into the canopy it can reduce the amount of light reaching the leaves of an old tree and can make the tree more liable to blow over in the wind or through its weight to shed branches.

Ivy (seen above on the ash approaching the 4th green) should be left on dead tree stumps because it is a valuable habitat but could be cut off specimen trees. Ivy is enshrined in our culture and folklore. Before the use of pub signs, ivy would be hung outside inns and vinters' premises to show that there was good wine within. If ivy was brought into the house attached to firewood, it would mean bad luck for the household. However, if it grew vigorously outside on a house, the household would be kept free from witchcraft and the Evil Eye. At harvest time, the last sheaf was called the Ivy Girl which was wrapped in ivy and ribbons and would bring prosperity to the farm in the future. Ivy leaves left in vinegar were a cure for corns in Oxfordshire. A girl hopeful of marriage would carry ivy leaves in her pocket - the first young man she met would be her future husband.

Ivy on trees can be a nuisance to timber buyers as it makes it harder to check the quality of the timber; it can hide rot holes and other defects. It also is an extra operation to remove the ivy from the trunk before it can be put through a sawmill.

Source: www.chilternsaonb.org/uploads/files/AboutTheChilterns/Woodlands/ivy.