



Harmony Arboriculture

'The Importance Of Tree Ecosystems' by Harmony Arboriculture

A brief introduction on how trees are an essential part of UK biodiversity

Trees are the powerhouse of ecosystems and wildlife habitats all over the world. Without them life would struggle to exist, and not only from a lack of oxygen or the provision of fresh food. Whether as part of an ancient woodland or a single entity standing alone in a field, a tree provides vital functions with far reaching implications to many kinds of **flora** and **fauna**, both large and microscopic.

Let's take, for instance, the most well known British tree; *Quercus robur* – the English oak. This particular oak lives in a small woodland on the headland of an arable field next to a stream. Its age is approximately 120 years and it is in good health. During its lifetime it has sustained some storm damage high up in the canopy, resulting in some limb loss, resulting in ripped bark and smashed branches. In previous years **woodpeckers** have made holes in some of the large limbs, and natural shedding of lower branches has left some minor decay pockets that the tree seems to be coping well with.

The crown

The crown of the tree incorporates all the branches, twigs and leaves that are supported by large, structural scaffold limbs that grow immediately out of the trunk. Our oak has quite a dense crown, providing great cover for **birds** such as owls to build their nests in the spring and summer months. There are signs of previous **grey squirrel** habitation as well, but now the drey seems abandoned. Our oak tree can provide all the items a bird needs to make a nest such as dead twigs and epiphytic **mosses** and **lichens**. Oak trees have up to 284 associated insects such as **moths**, **caterpillars** and **beetles** that will provide nourishment to both adult and young birds alike. Tiny mammals such as **mice**, **voles** and **shrews** that live in the vicinity of wooded headland are prey for larger birds such as owls.

Apart from birds our oak tree is also home to the **Bechstein's bat**, just one of eighteen species of bat found in the UK. Bechstein's bats favour old woodpecker holes to roost in, whilst other bat species such as the **barbastelle** use natural cracks and breakages, the kind caused by wind damage. The Bechstein's bat prefers wet woodland near streams where they feed on flying insects, consuming many hundreds, if not thousands, every night.

The crown of a tree is also home, and food, to many species of insects and **micro-fauna** such as **beetles**, **weevils**, **aphids**, **spiders**, **slugs**, **snails**, **wasps**, **bees** and more, each providing food for some other animal, or feeding off the tree itself. In extreme cases some moth caterpillars can strip an oak tree bare of its leaves in little time, prompting the oak tree to come up with an ingenious solution to this problem. In apprehension of being fed upon the oak tree's first growth of leaves is low in nutritional value. The caterpillars arrive, feast on the leaves, pupate into moths and then are gone. Now the oak tree can grow a second flush of nutritional rich leaves, called lammas growth, that serve the tree fully, without the threat of being totally consumed.

The trunk

The trunk of our oak tree is covered in fissured bark that becomes home to many insects and invertebrates. Patches of damaged bark that peel away from the tree beneath can even house bats and other small mammals. Large woodpecker holes, old branch wounds and pockets of decay also act as habitats, and can allow entry to fungal spores. Decay and fungal activity, although sometimes fatal, can actually enhance the biodiversity of a tree, by providing a safe place for creatures that live and thrive only in and on dead wood. The lower half of the trunk is covered in thick ivy. During the inter the ivy provides food, in the form of berries, as well as shelter to birds and hibernating animals. Ivy, being warm, dry and evergreen creates its own little micro-habitat that favours the smaller mammal and insect population of the tree.

The roots

Our oak tree is situated near a watercourse and so is able to meet its high water demand. The roots of the oak tree spread out far and are prominent along the stream bank. Along with other trees in the area the roots provide a way of strengthening the bank and slowing the rate of water erosion. If it wasn't for the trees and their roots the water would easily wash away the soil, change the course of the stream and lead to potential localised water-logging or flooding of valuable farmland. Animals that made their homes alongside the stream would suddenly find themselves with no refuge or shelter.

Burrowing mesofauna and microfauna aerate the soil around tree roots, providing the tree with oxygen and water.

As autumn approaches our oak tree begins to shut down. The leaves change colour as the tree stops producing the photosynthetic green pigment called chlorophyll. Water transport to the leaves is stopped and a plug to each leaf stem is filled, finally severing the link between twig and leaf, and the leaf drops to the ground. Even though dead the leaf now releases previously locked away nutrients into the ground, enriching the soil for the tree and surrounding plants to absorb next year. Meso- and microfauna that make their homes in and around the tree die and add their nutritional mass to the soil also.

Our oak tree has shed various twigs and branches over the past few months. Now **saprophytic fungi** feed on the dead organic matter, breaking it down and recycling the nutrients back into the soil. Without saprophytes fallen twigs, leaves and even entire trees would not rot away.

Thankfully **parasitic fungi** that feed on living woody tissue, often either killing parts of the tree, or the whole tree entirely, has not been seen nearby. When a tree has succumbed to parasitic fungi and is dead it is still a valuable habitat for all sorts of insects, which in turn feed the birds and bats.

Beneficial **Mycorrhizal fungi** have formed a partnership with our oak tree, helping it to absorb nutrients whilst in turn receiving moisture and carbohydrates back from the tree.

The underground ecosystem is a vast network of fungal **mycelium**, tree roots, animals and bacteria that interact interdependently. Even the parasitic fungi that may kill an entire tree within a few short months has benefit; the tree as a single organism has died but it becomes a valuable structure for many hundreds of other species to live and thrive on.

How about urban trees?

There's no reason why a tree in the middle of a city should not be as important to biodiversity than our 120 year old oak tree in a field. A city tree may benefit the ecosystem more because of its value as a habitat, inasmuch as there are less trees available, making each one more appealing to other flora and fauna. A householder who has a tree in their garden may one year have a birds nesting, even if they are in an artificial nesting box. The following year the birds return and decide to build their own nest. Bugs and mini-beasts provide food to other animals; birds spread seeds, and the wind pollinates flowers whether the tree is in a rural or urban location.

Conclusion

Our 120 year old oak tree has supported thousands, if not millions, of micro-lives so far. Should conditions remain favourable to the tree there is no reason why it should not continue to do so for another 500 years or so. As the tree gets older and begins to breakdown so it becomes even more valuable as a habitat, and its importance as a centre of biodiversity increases. Many generations of birds, bats, beasts and bryophytes will use its branches, trunk and roots to live their lives and add enrichment to the locality. The closely connected web of life that is so strongly attached to our magnificent oak should outlive anyone reading this today, but we must be willing to watch over it, for it is delicate and too easily broken.