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What are veteran trees? Where are they found? Why are they important?



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There is no easy definition of what is meant by the expression “veteran tree”. Each individual tree species and each individual tree have their own individual life expectancies. A tree is described as “veteran” when it reaches a certain stage in the latter half of its life expectancy. That stage starts with retrenchment - a term which is much easier to explain. Trees may however die before they reach that stage.

Life expectancy

This depends on a wide variety of influences, both genetic and environmental. Under “ideal” conditions an average *Quercus ruber* L. - a relatively long-lived European species - may live for anything between 500 and 1500 years, the actual figure varying according to genetic characters. Environmental variables, such as soil nutrient levels, competition from other vegetation, the impact of defoliating insects or browsing large vertebrate herbivores and local

weather patterns, will all affect this genetic potential. These variables will almost certainly change in intensity throughout such a long life span.

Some of these variables have the potential to kill a tree before it reaches its full potential age, ie before it would otherwise die.

The ageing process

A growing tree puts on a new ring of growth each year. The volume of tissues which make up this growth ring increases steadily in the early stages of its life - although varying from year to year according to local conditions for growth. At the same time the tree is growing taller and the canopy is developing. At about the time that the tree is reaching its full potential height and canopy development, the pattern of annual ring increment levels off.

Of course the circumference of the tree trunk is also increasing with the development of each annual ring. The consequence of this is that each ring has to have a larger circumference and which in turn has the effect of thinning the band of new tissues of each ring. This system cannot continue indefinitely!



*A deer Park with veteran trees, Windsor Great Park.
(Photograph: Ted Green).*

The tree reaches a stage where - in order to sustain itself - it cannot maintain the full high canopy, and individual high canopy branches are gradually abandoned and die. This process is called retrenchment or “growing downwards”, and it eventually leads to the development of a smaller, lower canopy, which is sustainable by the root system and the thinning living tissues of the trunk. The retrenched tree is what we call a veteran, or ancient, tree. It can continue for many centuries with this smaller, less-demanding canopy. The annual rings often become discontinuous as the girth of the tree trunk becomes enormous, exposing the dead heartwood beneath.

The decay process

The older tissues deep within the centre of the tree trunk and main boughs eventually cease to be needed by the tree and waste products of metabolism are transferred into the cells. These cells subsequently die. The core of any old tree is therefore dead, and the materials it contains are unavailable both to the tree itself and to most other organisms. However, some organisms can exploit these waste tissues - particularly decay fungi and certain insects (e.g. longhorn beetles *Cerambycidae*). Fungal decay of the heartwood of old trees starts a recycling process whereby the dead cells are broken down into compounds which can be used by other organisms and eventually the locked-up nutrients are released back into the environment and may be exploited once again by the tree itself through its roots.

Importance of large herbivores and people

With the gradual development of the smaller, lower canopy, the veteran tree becomes more susceptible to competition from other trees and it may become completely overshadowed and die through light deprivation. For veteran trees to develop there need to be factors restricting other plants which might otherwise out-compete them for sunlight! A key factor in heavily wooded country is the presence of large herbivores, browsing developing trees and shrubs, and eating seedlings. Under modern high forest conditions a retrenching tree will not survive long, but it has a good chance under wood pasture conditions - or in open countryside farmed by people or in their settlements.

Whether large herbivores or people, the result is that individual trees are able to develop in their own open space. An open-grown tree is able to put its energies into developing a full canopy, with the lower branches growing longer in comparison to higher branches. The whole form of an open-grown tree is relatively squat and of greater girth. This has important consequences for wildlife as the individual tree contributes a wider range of niches. It also makes the tree stronger, more stable and more resistant to wind-blow.

Ganoderma adspersum, a bracket fungus, growing on a veteran beech tree.
(Photograph: Ted Green).

WHY ARE VETERAN TREES IMPORTANT

There are many reasons why people value veteran trees:

- aesthetics - people like them for their own sakes;
- cultural history - they are living demonstrations of our relationships with the land and nature;
- natural history - they support a huge range of organisms which are mainly found on or in ancient trees, particularly fungi, invertebrates, lichens and mosses;
- forest ecology - veteran trees play a key part in the special value of old growth woodlands.

Aesthetics

This is arguably the single most important aspect of veteran trees as many more people value them as individual interesting trees and in the landscape. Veteran trees are attractive! The following aspects are of significance to many fewer people and so aesthetics will drive conservation to a greater extent.

Cultural history

Veteran trees are old! They are therefore part of the historical landscape and part of cultural history. They have survived through a combination of intrinsic values, lack of threat or competition with people.

The most striking examples of the relationships between veteran trees and people are pollards. Trees have the potential to produce many useful products for people. Where they stand amongst grazing livestock, however, cutting needs to take place at a level above the reach of browsing animals, so that the



regrowth will not be damaged and can be harvested once again. The results are pollards. Veteran pollards are a strong feature of cultural landscapes throughout Europe.

Natural History

Veteran trees support a wealth of wildlife that is more or less unique to them. The key features are the decay development within the trunks and the long-term stability of the trunk surfaces.

As decay proceeds then it creates a range of conditions which are exploited by a succession of other organisms. Continuing with the example of a *Quercus robur*, the trunk may be hollowed by fungi which break down the cellulose and the lignin constituents, causing a white rot, eg *Inonotus dryadeus* (Pers. ex Fr.) Murr., or by fungi which can only break down the cellulose, resulting in a brown or red rot, eg *Laetiporus sulphureus* (Bull. ex Fr.) Murr.. The two types of decay support distinct assemblages of invertebrates. The decay process is known to support many thousands of species of fungi and invertebrates, and probably bacteria and other micro-organisms. These wood-decay communities are therefore of considerable interest to naturalists and to nature conservation.

The cavities which result from decay provide roost sites for bats and nest sites for birds such as *Picidae*, *Tyto alba*, *Columba oenas*, *Phoenicurus phoenicurus*, and many others.

The bark of the trunk and boughs provide bare surfaces on which many epiphytic plants (lichens, mosses and liverworts) may grow. Unlike bare soil, the bare bark does not become colonised by vascular plants and so the surfaces are available to epiphytes for very long periods of time and become unusually rich in species. Different types of tree provide very

different bark conditions and so support different epiphyte communities.

These epiphytic plant communities themselves support unique assemblages of invertebrates and micro-organisms. Psocoptera are prominent amongst the insects, but there are also many specialist *Hemiptera*, *Lepidoptera*, *Coleoptera*, etc.

Forest Ecology

In addition to the special interest of their natural history, veteran trees are also of considerable interest to forest ecologists as they are the climax of forest ecosystems. The ecology of veteran trees is very much about ecological succession and nutrient cycling. They are key features of "old growth" woodlands. Such areas have become increasingly scarce throughout Europe, through modern intensive forestry and agricultural practices and few areas now remain where ecological research is still possible.

WHERE ARE THEY FOUND?

The relationships between veteran trees, large herbivores and people (see above) determine the types of situation where veteran trees survive in modern Europe:

- medieval hunting forests and chases;
- historic parklands;
- rough pasturelands, especially "common" grazings;
- field and other boundaries;
- along water courses;
- settlements.

With the loss of free-ranging wild large herbivores throughout much of Europe, wood pasture land man-



A veteran oak tree in Windsor Forest.
(Photograph: Ted Green).

agement systems have been the saviour of veteran trees. Relict areas of old hunting forests and the rough pasturelands provide the largest surviving expanses of country with veteran trees. Such lands were used for a wide variety of products - livestock, game and wood products. It was the diversity of the products that enabled veteran trees to persist, ensuring that they were sufficiently valued. In addition to wood products, trees provided shade for livestock and also leaf fodder at times of year when ground vegetation was not available - burnt off by hot summer sunshine or covered by winter snow. Subsequent product specialisation invariably led to the loss of the veterans: intensive livestock rearing and forestry have no need for veteran trees.

Historic parklands tended to be enclosed from these larger landscapes with veteran trees, creating small pockets of wood pasture habitat. In most cases these have since been subjected to landscape gardening and many have lost their veteran trees as a result.

The landscaping ideal was for full canopied trees, and only individual veterans may have been retained to add local interest.

Veteran pollards along boundaries provided a source of poles for repairing fences and walls. Along water courses their roots helped to stabilise the banks while pollarding meant that pastures were not unduly shaded. Within settlements pollards also provided a source of wood products close to hand as well as shelter from the hot sunshine in the summer months. They are “working trees” and therefore valued by the local communities •

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