

Wood pasture and other veteran tree sites

Wood pasture is grazed land supporting mature trees. Britain holds internationally important areas of wood pasture, veteran trees and associated invertebrates; their value lies in a long and continuous presence of old trees. The invertebrates typically require a variety of habitats for different stages of their life-cycles – usually a specific larval development site, plus one or more adult foraging habitats. Conserving both common and rare species depends on managing all habitats within the wood pasture, generating a diverse landscape mosaic. It is also important to protect collections of veteran trees that may now stand in ungrazed historic parkland, regenerated woodland, hedges, golf courses, arable land or traditional orchards.



A wood pasture habitat mosaic featuring veteran oaks, lying dead wood, bramble and pasture at Croft Castle, Herefordshire.

Right: Oak mining bee (*Andrena ferox*)

Far right: A longhorn beetle (*Rutpela maculata*)

Some S41 species associated with Wood pasture and other veteran tree sites

S41 species are some of our rarest or most threatened species which have been identified by the UK government as needing particular conservation action.

Bees:

Oak mining bee (*Andrena ferox*)

Beetles:

Caterpillar-hunter ground beetle (*Calosoma inquisitor*),
 Mab's lantern ground beetle (*Philorhizus quadrisignatus*),
 Noble chafer (*Gnorimus nobilis*),
 Oak click beetle (*Lacon querceus*),
 Red-horned cardinal click beetle (*Ampedus rufipennis*),
 Stag beetle (*Lucanus cervus*),
 Violet click beetle (*Limoniscus violaceus*)

Butterflies:

Peal-bordered Fritillary (*Boloria euphrosyne*)

Flies:

Golden hoverfly (*Callicera spinolae*),
 Royal splinter crane fly (*Gnophomyia elsneri*),
 Western wood vase hoverfly (*Myolepta potens*)

Moths:

Dark crimson underwing (*Catocala sponsa*),
 Light crimson underwing (*Catocala promissa*),
 Mistletoe marble (*Celypha woodiana*),
 Goat moth (*Cossus cossus*),
 Heart moth (*Dicycla oo*)

Find out where these species occur at the National Biodiversity Network (NBN) – see references.

Key habitat components of the mosaic and their management



1 Veteran trees

Trees ending their natural lifespan are termed 'veteran' or 'over-mature'. The current management of our countryside rarely allows such old trees to persist, so wood pasture is exceptionally important. It can contain ancient oaks, limes, Beech, Hornbeam, Ash, Sweet chestnut, Horse chestnut, Black poplar and willows; as well as smaller trees, such as Common hawthorn, Wild cherry, Wild crab and Holly.

Veteran trees produce a very wide range of distinct, small 'microhabitats' that are scarce in younger trees; invertebrates using these are termed 'saproxyllic'. They select specific sites for egg laying, such as: heartwood rot, wood mould, hollow trunks, dead attached limbs, water-filled rot holes, decaying roots, sap runs and partially detached bark. Other microhabitats are provided by the specific fungi, mosses and lichens associated with old trees.

Several hundred species of beetles use veteran trees, e.g. the Oak and Red-horned cardinal click beetles. Many



Oak, perhaps 800 years old, at Windsor Great Park.

Right: Oak click beetle.



The hoverfly (*Pocota personata*) (top right) breeds in water-filled rot holes (left); the crane fly (*Ctenophora flaveolata*) breeds in heart rot (lower right).



2 Dead trees, stumps and detached dead wood

As trees mature and die they produce hulks, stumps, fallen trunks and branches, exposed root plates (where the roots have been pulled up) or decaying roots below ground (where the trunk has snapped at its base). Some invertebrates specialise on microhabitats of fallen trees, e.g. the decaying layer under bark. Many others are associated with the fungi and slime moulds of detached dead wood, especially in very humid, shaded places – notably certain fungus gnats and crane flies. Dead wood located in the open supports aerial-nesting solitary bees and wasps, ants, spiders and further invertebrates that need cracks and crevices. Other invertebrates are less specific and will use both dead and old, living trees, e.g. the Stag beetle, which breeds in decaying roots.

- Standing dead trees are as valuable to invertebrates as fallen ones.
- Ensure that dead wood is allowed to lie / stand in a variety of conditions, ranging from very humid and shaded, to partially shaded or fully exposed to sunshine.

need trees standing in open, sunny situations. The various forms of heartwood rot, which lead to trunk hollowing, produce a particularly important set of microhabitats. Veteran trees, especially those in more humid, partially shaded areas, are also very important for flies, such as hoverflies and crane flies (e.g. Royal splinter crane fly). Trees in the open are also valuable for flies when they support wet wood rot underground or in rot holes (e.g. for the Golden hoverfly).

- Maintain as many veteran trees as possible, allowing these to age and die naturally, but continue any long-established pollarding. Re-pollarding will extend the life of old trees, which can otherwise be at risk of splitting, but do not remove all the limbs at the same time.
- Ensure a supply of both young and mature trees to provide future veterans. Continuity of varied decay / deadwood conditions is the most critical factor for long-term persistence of specialised invertebrates.
- Avoid heavy disturbance from livestock beneath the canopy, which might damage the roots or trunk. An appropriate stock barrier around a tree, in line with the perimeter of the canopy, will also form a boundary for activities such as ploughing or slurry spreading.
- Discourage visitors from staying beneath the canopy of veteran trees on public sites. This will prevent heavy disturbance and reduce the risk of injury from falling timber. Carry out individual safety checks on veteran trees.
- Avoid removing veteran, exotic trees where they are not causing problems, e.g. cedars, European oaks, Horse and Sweet chestnuts. These sometimes support the same valuable microhabitats and associated invertebrates as native, veteran trees.



A freshly fallen Beech will provide varied microhabitats for several decades (top). A veteran tree supports specialised fungi and associated invertebrates (lower left). A fallen trunk in partially shaded conditions supports different invertebrates from one in the open (lower right).



Heathland and acid grassland within wood pasture (Staverton Park, Suffolk).



Blossoming Hawthorn is one of the most important pollen and nectar sources in wood pasture.

Left: Noble chafer, associated especially with old orchards.

3 Semi-natural grassland and heathland

Grassland and heathland found within the wood pasture can support scarce invertebrates, e.g. Pearl-bordered fritillary. Other invertebrates depend on a range of resources in the habitat mosaic, e.g. the Sleepy mason bee (*Chelostoma florissomme*) nests in dead wood but forages on buttercups in grasslands. Grassland and heathland provides vital habitat for tens of species of ground-nesting solitary bees and wasps, such as the Oak mining bee, which gathers pollen from mature oaks in sheltered and sunny locations.

- Where possible, allow plants to flower by relaxing grazing or not cutting between April and September.
- Use rotational management to generate a diversity of heather structures / sward heights.
- Avoid using fertilisers on swards and remove arisings when cutting, to limit the nutrient load in grasslands.

4 Associated woodland, scrub, hedges and orchards

Patches of woodland may be present in wood pasture and support invertebrates that are not reliant on veteran trees. Wet Alder woodland associated with watercourses, lakesides or seepages is particularly rich in invertebrates. Hedgerows and scrub are very valuable foraging habitats for many flies and beetles that breed in dead wood, but require pollen and nectar as adults.

Important blossoming species include: Hawthorn, Sallows, Blackthorn, Rowan, Elder, Wild crab, Holly, Field maple, roses, Dogwood, Guelder-rose and ornamental species such as Cherry-laurel. Veteran trees found in these habitats are every bit as valuable as those growing in the open.

Traditional orchards are an important source of shorter-lived, veteran specimens of domesticated apples, pears and plums. They support the bulk of Britain's Noble chafer population, which uses heart rot and wood mould in hollow trunks and rot holes. Such orchards are also strongholds of mistletoe, the sole host for numerous invertebrates, including the Mistletoe marble, a micro-moth. Old orchards sometimes occur in association with wood pasture, e.g. at Croft Castle, Herefordshire, where they are likely to share wood-decay invertebrates. Orchards are also a useful source of spring blossom for bees and hoverflies.

- Retain patches of woodland and scrub, especially where this provides blossom and additional dead wood.
- Plant small blocks of flowering trees on sites that lack spring nectar sources.

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Veteran trees can occur within hedges surrounding wood pasture.

- Avoid any large-scale simultaneous woodland felling that suddenly exposes semi-shaded, veteran trees to full sunshine and wind - this can kill them.
- Managing hedges, on a minimum three year rotation, will create a range of species and heights across the landscape. Relaxing cutting will permit more profuse blossom and fruiting.
- Create new, traditionally managed orchards in districts where they already exist, allowing old trees with wood decay to persist. Control over-abundant mistletoe to prolong the lives of trees, by removing a proportion of the plants over successive seasons.



Tall herb vegetation with Hogweed.

5 Wetlands and water features

Wetland features, including streams and rivers, spring-fed marsh, ditches, dew ponds and artificial lakes can support a wide range of invertebrates, e.g. Medicinal leech (*Hirudo medicinalis*) at Moccas Park, Herefordshire. Water margins are also a valuable source of flowers, e.g. Water mint, Angelica, Meadowsweet and Marsh thistle, which will attract insects.

- Maintain wetland features and their marginal habitats (such as swamp) and ensure good water quality.
- Avoid excessive trampling of water margins by stock.
- If cutting back scrub or herbage to prevent over-shading and maintain varied vegetation structure, do this rotationally over several years.

6 Tall herb, bramble, nettle beds and Ivy

Umbellifers (notably Hogweed), thistles and brambles, occurring alongside road verge, hedges and fence lines provide food and shelter for insects breeding in dead wood; Ivy flowers are essential in early autumn for the Golden hoverfly and queen Hornets (*Vespa crabro*), while ivy itself provides overwintering sites for many invertebrates. Tall vegetation also provides humid conditions, which keeps lying dead wood moist and more valuable for invertebrates.

- Allow some tall, flowery herbs, brambles and nettle beds to develop in areas protected from grazing and cutting. Manage them rotationally over several years.
- Fencing off, or reducing livestock access to hedges, will help develop flower-rich hedge bottoms.
- Don't cut ivy stems or clear ivy from trees and built structures, unless it is causing a problem.



A wood pasture pond in Epping Forest, which supports a fine range of dragonflies.



Some wood pastures sites have experienced many centuries of continuous grazing.

7 Stock, dung and wild vertebrates

Wood pasture is grazed by sheep, cattle, ponies, deer, rabbits and occasionally pigs. Their dung supports a high abundance of invertebrates, which helps maintain wood pasture food webs. An important range of dung beetles and horseflies can be associated with wood pasture, e.g. the New Forest. Horseflies need streams or pools to breed in, but females also visit grazing animals for blood meals. Rabbits are a valuable source of dung, carrion and soil disturbance – all of which can promote invertebrates.

- Maintain any traditional grazing regimes, but avoid excessive stocking.
- Don't provide supplementary feeding, except where vital for livestock health.
- Avoid using avermectins in livestock.



Dark giant horsefly (*Tabanus sudeticus*)

CASE STUDY 1

Golden hoverfly (*Callicera spinolae*)

A rare, autumn-flying hoverfly known from several veteran tree sites in eastern England, some of which were formally managed as wood pasture. Like many saproxylic insects, it has very different adult and larval needs. It breeds in the water-filled rot holes of old trees, having been found in Beech, Maple and Ash. The adults require Ivy flowers and will fly some distance from the breeding trees to find these.



CASE STUDY 2

Violet click beetle (*Limoniscus violaceus*)

A rare beetle, afforded European-wide protection, found at just a few sites in the West Midlands and south-west and south-east England. It is associated with old broadleaved trees, including Ash, within wood pasture. The Violet click beetle requires a substantial number of suitable trees to provide continuity of breeding habitat: undisturbed wood mould at the base of central cavities. The low density of apparently suitable trees, at its known sites, is a cause for concern.



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