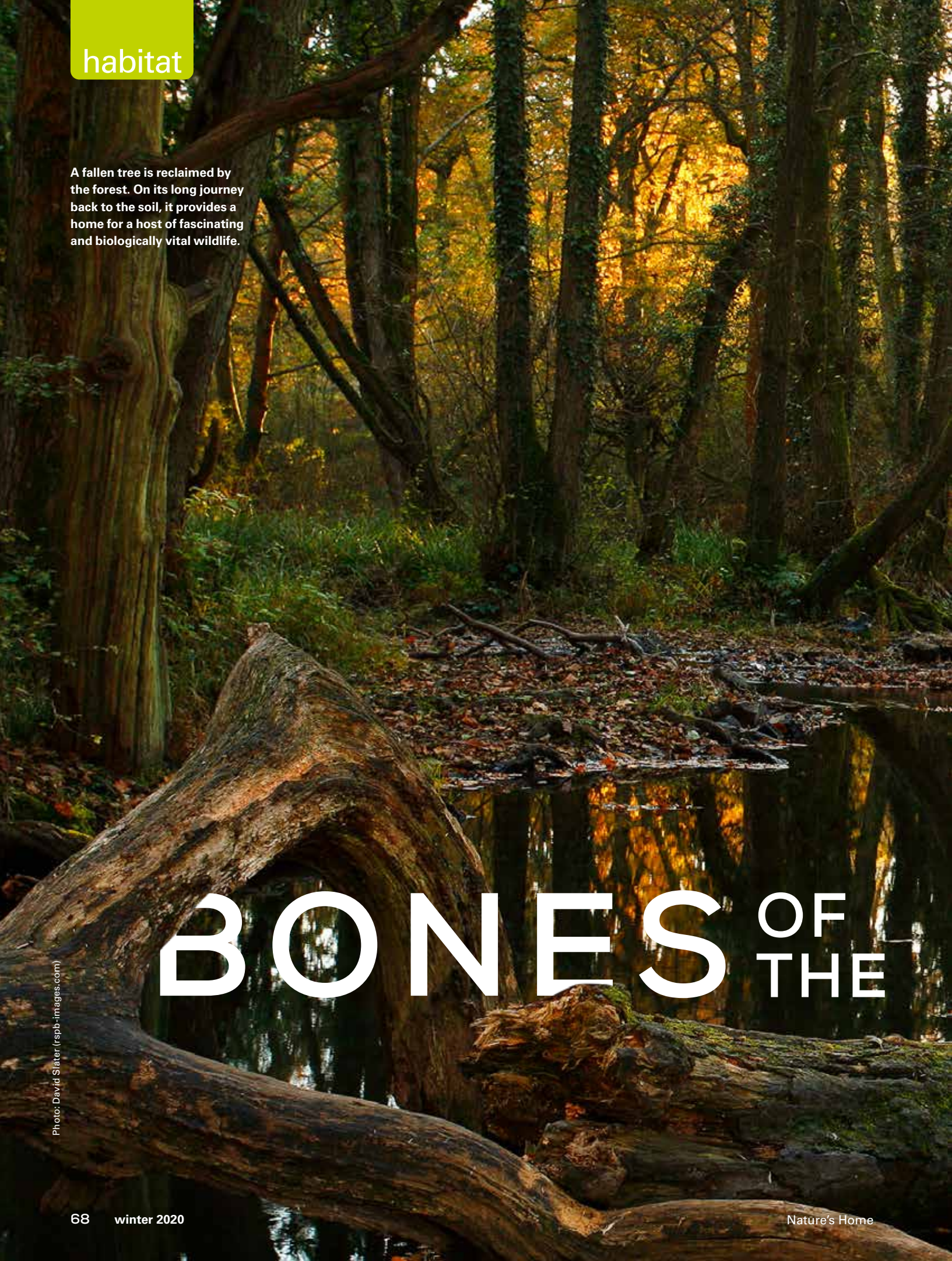
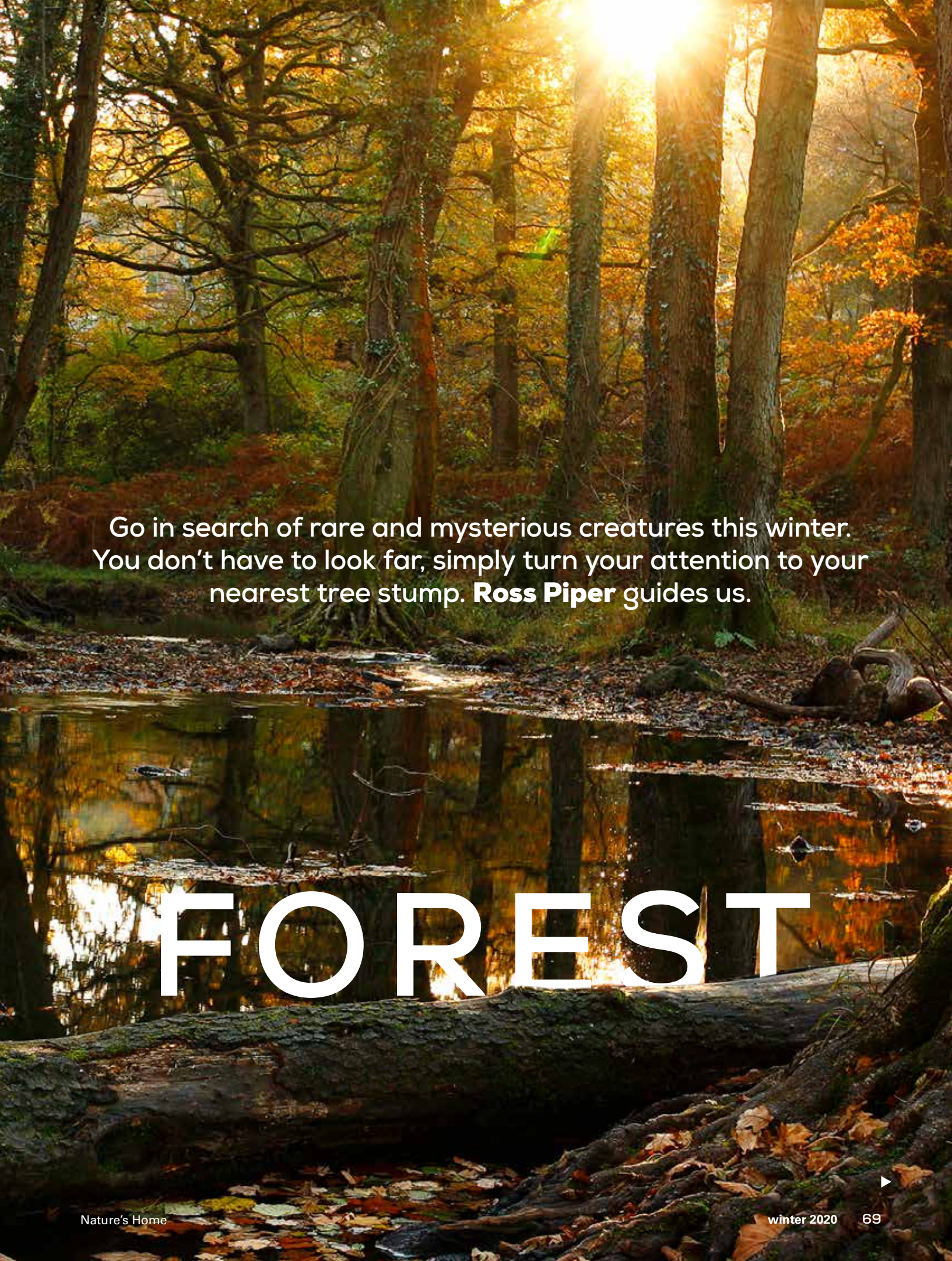


A fallen tree is reclaimed by the forest. On its long journey back to the soil, it provides a home for a host of fascinating and biologically vital wildlife.

BONES OF THE

Photo: David Slater (rspb-images.com)



Go in search of rare and mysterious creatures this winter. You don't have to look far, simply turn your attention to your nearest tree stump. **Ross Piper** guides us.

FOREST

Decaying tree stumps find a new lease of life hosting colourful fungi gardens, akin to an open-air coral reef. Below: Black lace-weaver spiders hatch under logs, then eat their mothers.

Leafcutter bees use holes in dead wood to make their nests.

False ladybirds feed on fungi under the bark of dead or dying trees.

Deep in the forest, a tree has died. Brought down by the turbulent storms of winter, its broken stump remains in place, cut off at the knees. It looks devoid of all life, but inside its woody flesh a tiny farmer is hard at work. The ship-timber beetle larva, *Hylecoetus dermestoides*, has hatched from an egg inoculated with a small batch of yeast spores (*Endomyces hylecoeti*). Tunnelling its way into the wood, the larva essentially farms the fungi, spreading the yeast as it moves. The spores grow quickly, lining the tunnels. It is this supply that will feed the larva, so it needs to take good care of it. It clears the tunnels of wood dust and frass (poo), as the yeast needs air to grow, and telltale mounds slowly build up on the ground outside.

This is just one of the many animals that depends on dead and decaying wood. Dead wood. It doesn't sound very promising does it, especially as the term itself is synonymous with the dispensable and extraneous? In actual fact, dead wood as a habitat is one of most overlooked and underrated habitats we have.

As an entomologist, I absolutely love dead wood. I've lost count of the number of fascinating little beasts I've found when rootling around a log or peering under the bark of a dead tree. For a long time, dead wood was a dirty word and people who looked after woodlands would fall over themselves to get rid of the stuff. Dead trees were chopped down and branches and trunks on the ground were often cleared away, chipped, burned or stacked in neat piles. This still happens in some places, especially the neat piles. Thankfully though, times are changing, and more and more people are understanding the importance of dead wood; both its habitat value and its place in the natural recycling of energy and nutrients.

> "Trees die, some fall, limbs wither in the canopy. All are valuable real estate to a complex web of life."

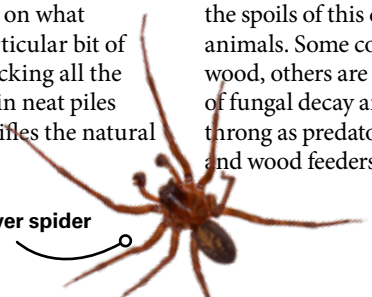
If you've ever been lucky enough to see a forest more or less unfettered by human hands, such as Białowieża Forest in Poland, you'll see dead wood everywhere. Trees die and remain standing, some fall, limbs and branches wither in the canopy or crash to the ground in winter storms. All of these, in every situation, are valuable real estate to a whole, complex web of life. The type of wood, its diameter, moisture content, position and fungal diversity all have a bearing on what animals will be using a particular bit of dead wood. This is why stacking all the dead or recently cut wood in neat piles throughout a woodland, stifles the natural potential of this resource.

A WEB OF LIFE

The various large animals that depend on dead and dying wood for food or nesting sites are well known – just think of woodpeckers, owls and a whole host of other birds and mammals. Less well known are the smaller animals that are completely dependent on dead wood for all or part of their lives.

In the UK alone, around 2,000 invertebrate species and counting are associated with dead wood, from tiny beings just about visible with the naked eye to some of our most spectacular insects.

Many of the small animals that depend on dead wood are actually there for the fungi. Fungi are the engines that break up wood, freeing up locked-in nutrients and energy and returning them to the soil to fuel more plant growth. Fungi are unrivalled in this ability and attracted to the spoils of this degradation are hordes of animals. Some come to feed on the fungi or wood, others are there for the by-products of fungal decay and still more join the throng as predators – picking off the fungi and wood feeders.



Black lace-weaver spider

Photos: David Osborn, Nick Upton (both rspb-images.com); Ross Piper

CREATURE COMFORTS

Find a sizeable chunk of dead wood in the right situation, such as a tall oak or beech stump in full sunlight or partial shade, and it will be teeming with life. Standing dead wood like this is the most valuable for wildlife. Here are just some of the species it supports…

Feeding just below the bark and in the deeper parts of the stump will be a dizzying array of insects (eg two-spotted oak buprestid, *Platycis minutus*, *Chalcosyrphus nemorum*, alder wood-wasp, *Aneurus laevis*, yellow-legged clearwing, sulphur tubic micro-moth) and their attendant predators and parasitoids (ant beetle, *Laemophloeus monilis*, *Xylophagus* beetle, *Ephialtes manifestator* wasp).

Common lizards may frequent prime basking spots or hunt insects and spiders on the fractured bark.

Tunnels and exit holes left behind by these insects will be colonised by a huge variety of solitary bees (eg *Osmia caerulescens*) and wasps (e.g. *Ectemnius sp., Crossocerus binotatus*) and spiders.

Larger cavities will be used by nesting ants (*Lasius brunneus*), social wasps (eg hornet) and honey bees, birds such as woodpeckers, tits, nuthatches, treecreepers, owls and kestrels, and even mammals such as rodents, squirrels and pine martens.

Quietly feeding on the wood itself and gradually breaking it down are an army of fungi that only betray their presence when their fruiting bodies burst out as brackets or a canopy of delicate caps.

The decaying roots will chewed and bored by still more insects and the spaces between the roots will serve as cosy refuges for larger mammals.

The detritus and frass that accumulates in cavities will be utilised by a fleet of other specialists, including some of our rarest insects (*Limoniscus violaceus*, *Gnorimus variabilis*, *Ctenophora ornata*).

Illustration: Dawn Cooper

Magnificent stag beetles need rotting tree stumps or part-buried moist dead wood to lay their eggs in. Right: *Laemophloeus monilis* – unassuming but very rare.

The big, impressive stag beetles are known to be associated with deadwood habitat. But in the UK a whopping 650 beetle species (from 53 families) depend on dead wood. Some feed on the wood itself, but many depend on the varied fungi that feed on the wood, or the fine wood mould that accumulates in the rot-cavities of standing trees. Even more are hunters, feeding on the species that nibble the wood and fungi. There are even some freeloaders, in the nests of ants and wasps that make their nests in dead and decaying trees.

Those creatures that consume dead wood haven't got it easy. They need assistance in the form of symbiotic gut microbes to help them stomach this tough diet. These microbes produce these enzymes to digest the wood and synthesise nutrients that are otherwise lacking but even so, the larvae of wood-munching insects can take many years to reach maturity, even decades in very poor conditions.

DOING OUR BIT

It's tragic that this hyper-diverse and fascinating habitat has been overlooked, even destroyed for so long. On many RSPB woodland reserves, staff work to create new dead wood for nature to be able to do its bit.

At RSPB Abernethy in Scotland, for example, active creation of this habitat has been going on for 30 years to restore areas of former commercial Scots pine plantation to more naturally functioning ecosystems. Deadwood creation is done regularly (ideally every year) in different parts of the reserve, to ensure continual input of dead wood across a wide area. Whole trees are either felled with a chainsaw or pulled over with a winch, which replicates the natural blowing-over of a tree in a storm, exposing the roots. Ring-barking also works, simulating how trees can be killed by damage, for instance by deer rubbing against them. A range of tree sizes and ages will be selected for deadwood creation, but needless to say the 'granny pines' that make this site so special, or any moribund trees, are not targeted in this habitat restoration.

In addition, the RSPB has a policy of 'passive' deadwood creation, which means leaving naturally occurring dead wood in situ (eg arising from self-thinning and windblow) and, over the longer term, allowing stands to grow on to maturity and natural senescence.

Lesser spotted woodpeckers declined by 83% between 1970 and 2015. The loss of dead wood for nesting could be a factor.

Restoring these natural systems is inevitably a slow process. Pip Gullett, who is researching the success of some of these deadwood creation projects says: "Restoring former plantations to more natural, self-sustaining woodlands is inevitably a slow process, taking place over the course of many decades, perhaps a century – it depends on the precise measures of restoration success, as well as other factors, such as the intensity of restoration work and the location; climate, soils, etc all influence tree growth rates and natural processes."

Pip adds: "There's still a lot we don't know about how best to achieve such restoration work, which is why the deadwood research by Cairngorms Connect and funded by Endangered Landscape Programme, is so exciting. With better understanding, we hope to be able to restore these habitats more effectively in the future."

Most of us don't manage woodland, but we can all still do our bit to make sure there's plenty of dead wood in the landscape. Raise awareness among people who look after areas where there are trees. Talk to your local councils, landowners and conservation groups. The more people who know about the value of deadwood habitat, the more they will help protect it. You can also create this vital habitat in your own gardens, parks and community spaces – see box for ideas.

If you're a keen entomologist, there's more you can do, too. The really exciting thing about this habitat is the fact that it's ripe for discovery. On the whole, the biology of deadwood animals is very poorly known. Exactly where they live, what they eat and who eats them is often a mystery. So, get out there and start filling in the blanks. You never know what you might discover! ■

Ross Piper is an entomologist and zoologist (see p21). Learn more about saproxylic beetles at rosspiper.net/2020/01/10/saproxylic-beetles.

#ActionForNature

➜ 3 WAYS TO CREATE DEADWOOD HABITAT

- Leave dead trees cut to tall stumps and leave in situ.
- Place branches and logs on the ground in different locations, with some part buried in the soil.
- Create a log pile in your garden, perhaps several in different situations (wet, dry, sunny, shady) to provide a variety of micro habitats.

Photos: Mike Read and Danny Green (both rspb-images.com); Ross Piper