# If you go down to the woods tonight...

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**Bats - we tend to lump these enigmatic flying mammals together as if they all have ecologically similar needs and requirements.**

Britain's bats do have common features, such as the ability to fly and their use of echolocation to navigate the night skies and find their prey. Their life history traits are also similar, with a complex annual cycle of autumn mating followed by winter hibernation and the gathering of females in spring to give birth, and their extraordinary longevity for such small mammals - some individuals live for over 40 years. But that is where the similarities stop.

The 17 breeding bat species in Britain have evolved over thousands of years and avoid competing with one another by exploiting different ecological niches. There are differences in their prey base, the type of habitat in which they forage, their roosts and their social structure. This great diversity of needs is fulfilled by our most diverse habitat - woodland. In managing woods for the different bat species, clearly one size does not fit all and prescriptions need to reflect this.

## A place to live and a place to breed

Aside from bats' foraging needs, the most important resource woodland provides is roosting sites. In historical terms, bats generally fall into two groups: those evolved to roost in caves and those adapted to tree roosts.

The relative permanency of caves contrasts with the transient nature of tree roosts. Although trees may live for many centuries, the structures within them that bats use change over time; rot holes are continually enlarging, hollow limbs may be shed and storm damage may open up new roosting opportunities. This dynamic situation means colonies of tree-dwelling bats are constantly adapting to the changing suite of roosting opportunities. On top of this, tree roosts are usually confined spaces where droppings and parasites can build up. So tree bats typically switch roosts on a regular basis, allowing them to avoid unhygienic conditions but also identifying and adopting new sites as old ones become unsuitable.

## Bechstein's bats

One of our most iconic woodland species is the Bechstein's bat, ***Myotis bechsteinii***. During summer males and females roost in different woodlands, with the females almost invariably found in old-growth oak forest. The females usually roost in old woodpecker holes and studies have shown a colony may use up to sixty different roosts over a summer. Clearly, protecting just a single roost tree is unlikely to have a significant conservation impact on a colony of this species.

In August, at the end of the breeding season, the sexual segregation in Bechstein's bats breaks down and the females disperse from their maternity woods into the wider landscape to mate. Recent evidence strongly suggests this species over-winters deep in fissures in caves and mines. For other species woodlands can remain their home all year around.

## Barbastelle bats

The barbastelle, ***Barbastella barbastellus***, is a specialist moth predator and its roosting ecology provides an insight into the range of structures bats can use over an annual cycle. In winter, this species hibernates in cavities deep within trees where it is buffered from extreme weather conditions. In spring and autumn they are found under loose bark, but during the summer months pregnant and lactating females move into cracks in the trunks and branches of old or storm-damaged trees.

Robiller Naturlichter

Barbastelle bat

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Bechsteins bat

## Noctule bats

Woodlands do not only provide bats with summer roosts and hibernation sites. Autumn is the time when most mating takes place and some species use mating roosts in tree hollows. The noctule, ***Nyctalus noctula***, is another woodland bat and one of our largest bat species. Males of this species attempt to attract passing females into these mating roosts by calling loudly from the entrance. They often set up a competition with one another around the edge of woodland glades. This behaviour allows the females to assess the quality of potential mates before they choose which mating roost to visit.

## Enhancing roosting opportunities for bats

Clearly, the number and diversity of roosting opportunities offered in woodlands is very dependent on management practices. The best prescription for maintaining the dynamic creation of a supply of new roosts is not to over-manage them, but to allow a natural cycle of ageing and the development of climax woodland.

Where past practice has selectively removed older trees and also in newer plantations, roosting opportunities for bats can be supplemented by the provision of bat boxes. These come in a range of shapes and sizes and particular species can show a preference for a specific design. Traditionally, bat boxes have been constructed of wood but in recent years the manufacture of boxes made from woodcrete (a mixture of sawdust and cement) have proved very successful and have the advantage of lasting far longer than their wooden counterparts.

Bat boxes may be a temporary solution but it is far better to have natural tree holes. Natural cavities for bats are usually dependent on some trauma to the tree; either physical damage or through disease and rot. Surgery to remove damaged limbs or the felling of senescent trees often removes the very structures providing the most roosting opportunities for bats. This standing dead wood not only provides roosts; the saproxylic insects associated with it are also an important food resource for the bats.

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Noctule bat

## Divide and devour: partitioning food resources in woodland

It is not surprising the diversity and biomass of invertebrate life found in woodlands attracts foraging bats. Most of our bat species are insectivores but the diet of some does include other arthropods such as spiders, harvestmen and millipedes.

Most bats that roost in woods also forage in them, but there are exceptions. The barbastelle, with its specialism on moths, often leaves woodland and ranges widely in the landscape. In the summer months the noctule hunts moths and large beetles over large water bodies or farmland. But the species the woodland loses at dusk are counter-balanced with new nightly arrivals roosting in nearby buildings.

The lesser horseshoe bat, ***Rhinolophus hipposideros***, roosts in the roof spaces of old buildings that mimic its traditional cave habitat, but it is almost totally dependent on woodland for foraging. It is adapted to hunt for small flying insects within vegetative clutter, often within the canopy of trees. Its short broad wings make it highly manoeuvrable and its echolocation call, the highest frequency of all British bats, is designed to detect the wing movements of small flying insects among dense vegetation.

The common pipistrelle, ***Pipistrellus pipistrellus***, a species that predominantly roosts in buildings during the summer, also frequently hunts in woodland. Its main prey are a similar size to those insects taken by the lesser horseshoe-bat, but its wing shape and echolocation calls make it adapted to fly and hunt in open areas. It can often be seen foraging in clearings or along the edges of woodland.

Pipistrelles, in common with most British bats, hunt by aerially hawking insects but some of our woodland foragers are gleaning specialists. Brown long-eared, ***Plecotus auritus***, and Bechstein's bats have huge ears. They hunt by listening for noises made by insects or other arthropods moving among vegetation or leaf litter, and can pick their prey off surfaces while in flight.

## Increasing insect biomass and diversity

Woodland management practices aimed at increasing insect diversity and biomass will benefit bats. Among the most important of these is the creation of mosaics of habitat. Even species like the lesser horseshoe bat, which forages within canopy cover, has been shown to favour the ecotones along the edge of woodland glades.

Wet areas or streams within woodlands are also of benefit and the Bechstein's bat preferentially selects these as its foraging areas, probably because of the insect populations associated with them. Standing deadwood and decaying log piles will also help to increase insect biomass, and native night-scented plant species such as honeysuckle, ***Lonicera periclymenum***, attract nocturnal insects like moths (Lepidoptera species).

## Find out what is there first

The exact ecological requirements of the different bat species are complex and methods of woodland management suitable for some species may be detrimental to others. Returning unmanaged woods back to wood-pasture probably has little impact on most woodland bats, but the presence of a well-developed understorey is vital for two of our most rare species - barbastelle and Bechstein's bats. It is well worth conducting bat surveys to determine which bat species are present before embarking on major changes in woodland management.