Observatree
monitoring tree health

www.observatree.org.uk

‘**Host of the month**’ is a series of information sheets and blogs that highlight a tree host and their associated priority pests and diseases that are best seen and recorded in that month. For March we’re looking at birch (*Betula* species), and bronze birch borer.

Birches are the predominant source of hardwood timber in Northern Europe and an important part of the Boreal ecosystem. Great Britain has three native species; Silver birch (*Betula pendula* Roth.), Downy birch (*Betula pubescens* Ehrh.) and Dwarf birch (*Betula nana* L.). You might also come across some of the non-native birch species which are commonly planted in parks, gardens and other amenity areas, one of the most common being Himalayan Birch (*Betula utilis var jacquemontii)* with distinctive bright-white smooth bark (fig. 1).

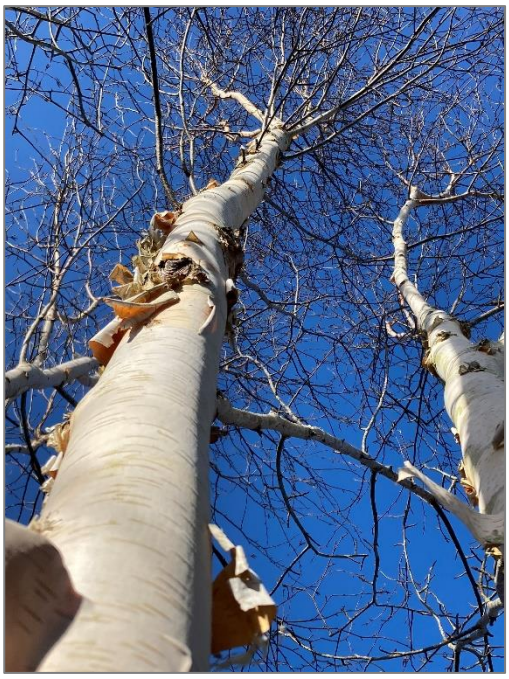

Figure 1: smooth white bark of Himalayan birch.

Birches are members of the *Betulaceae* which includes alders (*Alnus*), Hazel (*Corylus*) and hornbeams (*Carpinus*), all of them with characteristic male flowers arranged in pendulous catkins alongside the less conspicuous female flowers.

Dwarf birch is a shrub-like diminutive species which grows only on peaty ground in the uplands of northern England and central and northern Scotland, so it is unlikely you’ll come across it. Silver and Downy birch are widespread and can be difficult to separate from each other; individual trees do not always comply strictly with published species descriptions, and they hybridise (*B.* x *aurata*). As with any plant identification, if uncertain it is better to stick at the genus level and give the identification simply as ‘Birch’.

In winter there are three key things to look at to separate Downy and Silver birch: the overall form of the tree, the bark on the trunk, and the young twigs (fig. 2). In Silver birch the branchlets tend to be strongly pendulous or weeping in comparison with Downy birch but note that this is a continuum and not all individuals show either state strongly. The bark of young trees is very similar, but as they age the bark of Silver birch is silvery-white and typically adorned with black vertical fissures especially towards the base, and A-shaped black markings above branch insertions. In Downy birch the mature bark tends to be brown to grey white with slightly raised horizontal markings, only very rarely with black vertical fissures.

Observatree is a citizen science project led by Forest Research, in collaboration with key organisations

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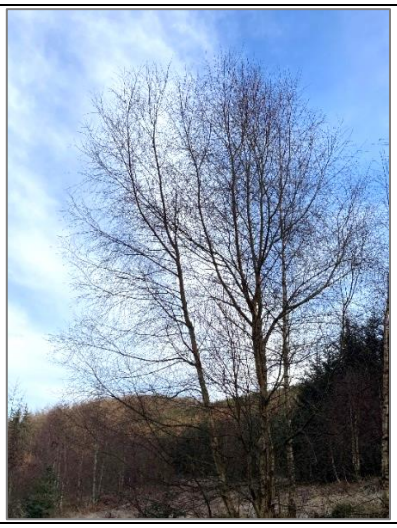
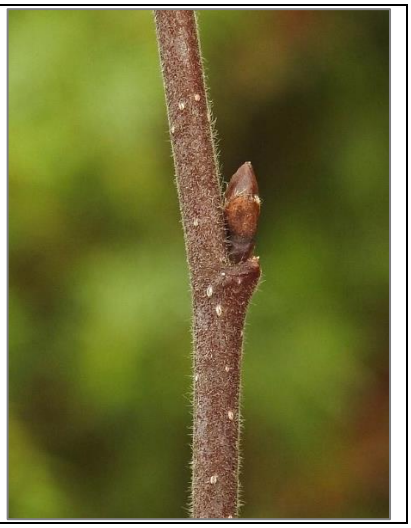
	Form	Bark	Winter shoots
Silver birch			
Downy birch			

Figure 2: a comparison of the key characters which can help to differentiate between silver and downy birch in winter (*downy birch twig image courtesy of G.routledge*)

The young winter shoots of Silver birch are usually hairless except on vigorous shoots or saplings, and have variable amounts of white 'warts'. In Downy birch the shoots are variably hairy, sometimes densely so, and with scattered shiny brown glands, only rarely with white warts.

The two species also have broadly different habitat preferences, Silver birch being more prevalent on drier soils, Downy birch on wetter peaty ones. In summer and autumn additional characters such as leaf margins,

seed wings and catkin scales are helpful too. For more information on the identification of the native birches the Botanical Society of Britain and Ireland Plant Crib is a useful place to start.

Priority pest - bronze birch borer *(Agrilus anxius)*

Bronze birch borer (BBB) is a non-native pest of birch trees which has not yet been found outside of its native range across the USA and Canada where it is considered the most serious pest of birch species. BBB larvae feed on the inner bark and cambium of their host, severing the flow of nutrients in the phloem and destroying critical cambium tissues – i.e. internally girdling the tree. Attacks on native North American birch species usually occur on stressed or senescing trees but based on observations of planted and amenity trees in North America the European and Asian species exhibit limited resistance and very high mortality. In Great Britain and Europe birches are important pioneer species that are often the dominant trees further north and they support a diverse community of invertebrates. This combination of high host mortality, wide distribution and ecological and commercial importance of birch mean that BBB could have catastrophic effects if it reaches Great Britain.

Identification and life-cycle

Adult bronze birch borer beetles (BBB) are between 7 and 12mm long and a metallic copper-colour with the characteristic bullet-like shape of other *Agrilus* species (fig. 3). The female beetles lay their eggs in crevices in the bark of host trees and once hatched the larvae feed within the inner bark for 1-2 years before pupating. Adults emerge through the bark via a characteristic D-shaped exit hole and feed on foliage of the host and other species.

Figure 3: adult bronze birch borer (left - David Cappaert, Michigan State University, Bugwood.org) and characteristic D-shaped exit hole in birch bark (crown copyright, David Williams, Forest Research)

Signs and symptoms

Characteristic D-shaped exit holes may be the first external signs of attack but with increasing numbers of larvae leaf yellowing and subsequent branch dieback in the upper canopy soon follows. These may be accompanied by swellings and bumps as the tree responds to the cambium damage by tunnelling larvae, sometimes with associated rusty-coloured sap and staining on the outer bark. In common with many pests and diseases that girdle stems the trees can also respond by producing abundant epicormic shoots (figure 4).

Figure 4: left to right – sinusoidal feeding tunnels of BBB larvae (*Crown copyright, David Williams, Forest Research*), swellings on the bark of infested birch associated with larval feeding tunnels (*Steven Katovich, Bugwood.org*), foliage yellowing and early senescence (*Steven Katovich, Bugwood.org*), and crown dieback with abundant epicormic shoots in a heavily infested birch (*Crown copyright, David WIliams, Forest Research*)

Lookalikes

Two other species of *Agrilus* which feed on Birch are present in Great Britain, the native *A. viridis* and the non-native *A. olivicolor* which has colonised from mainland Europe. Both leave the same D-shaped exit holes as BBB but are not fatal to the host tree (fig. 5).

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Figure 5: *Agrilus viridis* (left - *© 2007-2021 Christoph Benisch, available at: https://www.kerbtier.de/cgi-bin/enFSearch.cgi?Fam=Buprestidae*) and *A. olivicolor* (right – *© Andreas Haslebock @ www.naturspaziergang.de*)

Birch bark beetle (*Scolytus ratzeburgi*) larvae also feed beneath the bark of birch trees but these produce vertical lines of circular ventilation holes (diameter approx. 2mm) in the bark rather than the D-shaped exit holes of Agrilus. Below the bark feeding galleries radiate out from a central gallery rather than the wandering sinusoidal ones of BBB. (figure 6).

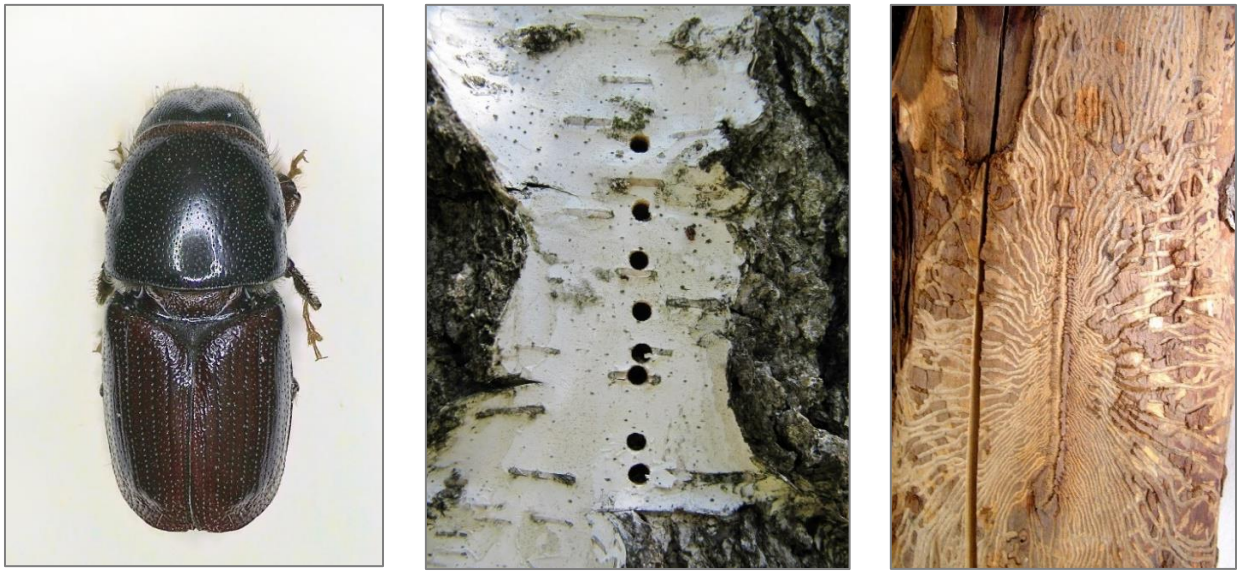

Figure 6: left to right – adult birch bark beetle (*Ján Kollár*), vertical line of ventilation holes associated with feeding galleries (*Andrej Gubka*), and galleries beneath the bark (*Ján Kollár*). All images available at Scolytus ratzeburgi / Birch bark beetle (forestpests.eu).

Many fungal species can affect birch but two in particular can give rise to shoot dieback akin to that initially caused by BBB. ***Anisogramma virgultorum*** normally infects Downy birch and only rarely seen on Silver birch, in both cases it causes dieback on stressed trees. Identified by narrow split-like cankers on the twigs with round fruit-bodies (perithecia) visible in the cankers via a x 10 hand-lens (figure 7).

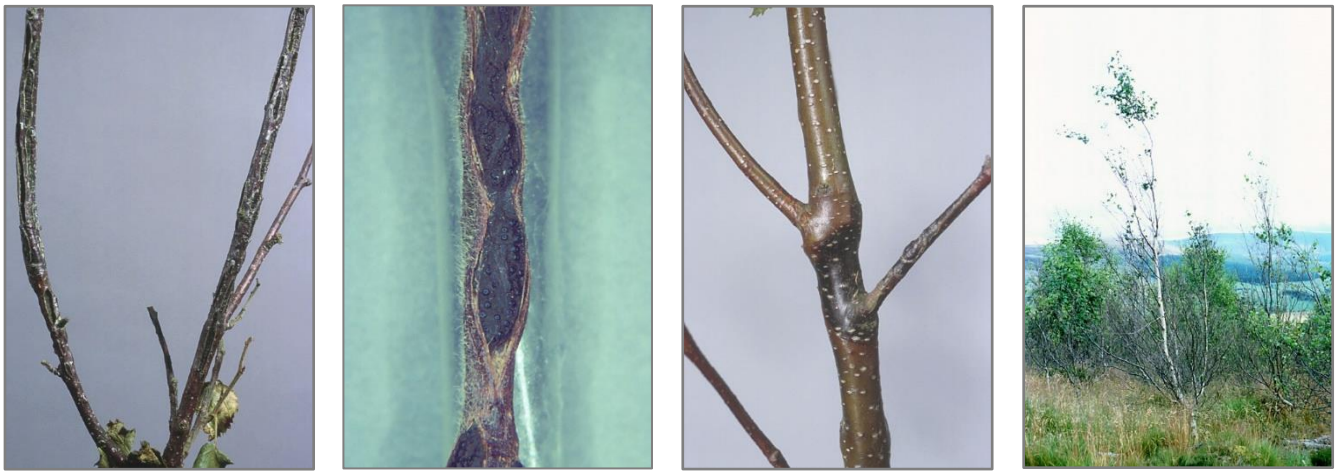

Figure 7: left to right – split-like cankers and fruit bodies within them caused by *Anisogramma virgultorum*, and sunken cankers at a twig insertion point and young Silver birch with lower crown dieback and 'tuft' of healthy growth at the top caused by *Marssoniana betulae* (*Crown copyright Forest Research*).

In contrast ***Marssonina betulae*** mainly attacks silver birch but can sometimes be found on downy birch. It infects leaves in wet weather producing irregular brown spots on leaves, the fungus then extending into twigs and causing sunken dark cankers around shoot or branch insertion points. Dieback tends to be low in the crown with a healthy tuft of shoots up top (fig. 7).

Reporting

Bronze birch borer is not currently known to be present in the UK and is a notifiable pest so please report possible sightings via TreeAlert.

For more information and resources on this priority pest check the Observatree website.

Matt Parratt, Forest Research, February 2025

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