

The lichens of Muir of Dinnet's birch and pinewoods



Evernia prunastri

When thinking about the Cairngorms, many people will have in mind images of the vast birch and pinewoods that cover lower slopes, with birds building nests in the nooks of branches and butterflies guarding the undergrowth of fragrant heather later in summer. These woodlands are also clad heavily in lichens and many of the characteristic lichen species can be found here at Muir of Dinnet NNR. This self-guided walk follows the Parkin's Moss Trail (2 miles, 3,5 kilometers). Along the way, we will look at some of these lichens and explore their role in the woodland ecosystem.

Your experience of this walk will be greatly enhanced if you have a x10 handlens or magnifying glass, or are able to take good close-up photos with your phone or camera.

Birch

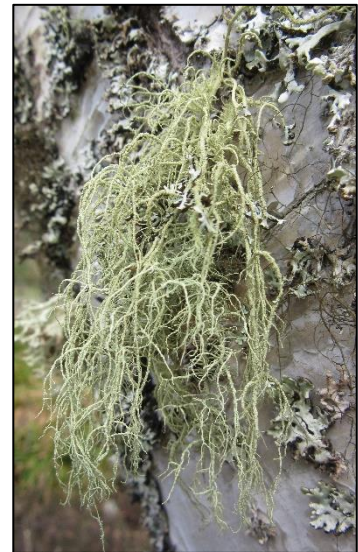
From the visitor centre car park, carefully cross the road and stop immediately at the first signpost (NO4297 9971).

The birch trees here are heavily clad in lichens. Based on colour and texture, how many lichen species can you distinguish on those birch trees?



Bryoria fuscescens

Lichens are not one, but two species. Most lichens that you'll find along this walk are a symbiosis of a fungus and a green algae. Other species of lichen may, however, be a symbiosis between a species of fungus and a cyanobacterium. The fungus forms the outer layer of the lichen and provides the green algae inside protection. In return, the green algae are responsible for photosynthesis and the provision of energy to the fungus.



Usnea subfloridana

Can you find any *Evernia prunastri*, *Usnea subfloridana* and *Bryoria fuscescens* on these birch trees?

Turn left to walk the Parkin's Moss trail in clockwise direction.

Scots pine

Follow the combined trails to where the Parkin's Moss trail turns sharp right while the other trails turn left. Stop here (NO4325 9990).

The birch and pine woodlands we're walking through provide a lot of substratum for lichens to attach to. The bark of both birch and Scots pine is acidic and attracts a particular group of lichen species. In addition to the *Evernia prunastri*, *Usnea subfloridana* and *Bryoria fuscescens*, you'll find *Hypogymnia physodes* and *Parmelia sulcata* on the trunks of Scots pine at this point.



Hypogymnia physodes



Parmelia sulcata

As birch and pinewoods are quite open, a lot of light reaches the ground and there is therefore a rich ground layer. Lichens benefit from this light as well, as it allows the green algae to photosynthesise. But the green algae are only able to turn light into sugars when the lichen contains just the right amount of water. When it rains, the lichen will quickly absorb water across its entire thallus. This makes the outer fungal layer transparent and gives the green algae inside access to light. A few hours after it has stopped raining, the lichen will dry out again and stop its metabolism. Most plants wilt when drought persists, but lichens will just wait patiently until it rains again.

Follow the narrow path as it gradually descends towards open fields.

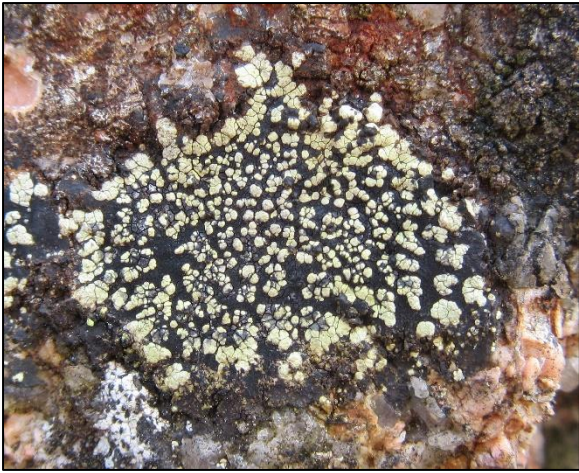
Dyke

Stop where the woodland opens up and there is a dyke on the left side of the path (NO4324 9970).

Rocks and boulders are part and parcel of the Cairngorms landscape and provide important



Umbilicaria polyphylla



Rhizocarpon geographicum

building materials for houses and field boundaries. Dykes can be true treasure troves for lichen hunters as varying degrees of light and humidity create a number of niches that each attract specific lichen species. The sides of the dykes are often covered in crustose species, but the crevices between boulders and at the foot of the dykes that are covered by vegetation often have powdery species.

Can you find any *Umbilicaria polyphylla*, *Parmelia saxatilis* and *Rhizocarpon geographicum* on the dyke?

Continue walking for just fifty yards.



Parmelia saxatilis

Ash

Stop where there are two large ash trees either side of the path (NO4324 9965).

Especially near farmland on the lower slopes of the Cairngorms ash trees are a common sight. Their basic bark attracts different lichen species and that is good news for the lichen diversity of an area. Look at the trunks of these ash trees and some of the branches on the ground. Can you find any *Xanthoria parietina*, *Physconia distorta* and *Ramalina farinacea*?



Xanthoria parietina

For lichens, creating offspring can be a particular challenge as the lichen symbiosis can only form when both the fungus and the green algae are present. Lichens have therefore developed different strategies to reproduce and disperse. Some lichens have apothecia that contain spores. Those spores are very light cells that can be carried along by the wind over longer distances. As they only contain fungal cells, they need to find a

green algae match and that can be a challenge. To avoid the risk of not finding a new partner, lichens can also reproduce clonally through soredia or isidia. These vegetative structures contain cells of both the fungus and the green algae. As these structures are heavier, they tend to settle closer to the source lichen.



Physconia distorta

Have a look at some of the apothecia, soredia and isidia of lichens on the ash trees and dykes at this point. *Xanthoria parietina* and *Physconia distorta*

tend to be covered in jam-tart looking apothecia, and the black islands in *Rhizocarpon geographicum* are apothecia as well. If you look at *Ramalina farinacea* with a hand lens you will notice that on the edge of the branches they have oval structures with soredia. Imagine



Ramalina farinacea

them blowing off in the wind. The centre of *Parmelia saxatilis* is covered in pin-like isidia that break off easily when an animal or perhaps a human passer-by touches them.

Continue following the path past the holiday cottage at Bogingore.

Mossy dyke

Between here and the next junction (NO4322 9955), the top of the dykes have gathered a thin layer of soil and plenty of mosses. These are an excellent place to look for Cladonia species. The birch and pinewoods of the Cairngorms are home to a large number of them.

The top of dykes can be covered in tiny cup lichens, species that form spikes and cushion forming *Cladonia* species. Can you find any *Cladonia* species on these dykes?

Turn left at the junction and continue the trail until it leaves the track to turn right (NO4357 9910).



A spike-forming *Cladonia* species

Slugs and snails

Once you get your eye in, you'll find lichens everywhere. And other species have got their eye on them as well! Quite a few invertebrates



A cup-forming *Cladonia* species

shelter beneath and between leafy lichens. Can you see any blue tits feasting on lichen-clad branches? Long-tailed tits use the lichen *Parmelia sulcata* to camouflage their nests. Other invertebrates eat lichens. Slugs and snails will crawl up the trunk to graze on the protein-rich apothecia. You can see evidence of such grazing when lichens have lost their reproductive structures and have left a zigzag pattern on the thallus. But lichens are having none of this. To avoid being eaten, they produce specific chemicals that deter such herbivores.

Continue along the trail and turn left onto a narrow path.

Heather

Where the path rises, just before you reach the boardwalk across Parkin's Moss (NO4344 9896), you'll find an example of cushion forming *Cladonia* species. On the ground between the heather there is quite a lot of *Cladonia portentosa*, a species that can also be seen on top of the bog mosses in the raised bog itself.



Cladonia portentosa

Follow the board walk until you reach a wooden railing (NO4335 9885).

Boardwalk

Wooden structures like railings and fenceposts can be exciting lichen substratum. In the absence of bark, they allow lichens to grow directly on lignum. *Lecanora varia* is one of the species that has specialised in wood.



Lecanora varia

Many of the lichen species we have looked at thus far are common in birch and pinewoods. There is plenty of habitat for them, they're not too choosy as to the



Cetraria sepincola

specific conditions in which they grow, and they have effective dispersal mechanisms. The brown species on the wooden railing is *Cetraria sepincola*, a much less common species that is often found on brittle birch twigs. Have a look at it with a hand lens, can you see any apothecia?

Continue along the boardwalk and then the narrow path, and turn left when you return to the main path. At the gate, turn right and then pick up another main path.

Dead wood

Stop where there are several larger birch logs next to the path (4319 9932).

The biodiversity of any woodland is greatly enhanced by the presence of dead and decaying wood, and this is no less true for lichen diversity. As wood decays, bark comes off and a range of different niches are created. Dead wood certainly is a favourite of many *Cladonia* species. Can you find any *Cladonia* species on these trunks?



A Cladonia species on dead wood

And have another look. Can you find any fungi species in close vicinity to the lichens? Research has shown that some lichen species produce chemical substances to deter non-lichenised fungi nearby. These fungi tend to decompose dead wood, in turn changing the trunk physically and chemically. Lichens, however, like the log just as it is, and prefer to maintain those conditions.

Continue along the trail until you reach the bridge.

Bridge

Stop at the bridge (NO4295 9958) and take a look around you.

The storms of winter 2021/22 have felled a lot of trees, creating a lot of dead wood. A lot of lichens have fallen to the ground. As lichens absorb nutrients from the air and produce chemicals to deter herbivory and fungi, these decomposing lichens will contain nutrients that will become available to plants and trees. Within a few years the openings created by this

winter's storms will be filled with young trees and new bark for lichens to colonise. Which lichen species do you expect to colonise these young trees first?

Descriptions and additional photos of all species mentioned in this self-guided walk can be found on <https://scottishlichens.co.uk>



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