The Mosses of Morrone Birkwood

When walking through spring-green birchwoods or across buzzing, purple moorlands it can, at times, be good to stop and tune in to the shy calls of bullfinches or the low rasp of raven overhead. And as we do so, our eyes will undoubtedly pick up on the lush carpets of mosses at our feet. In this self-guided walk we will take a closer look at some of those mosses. We will follow the circular route through Morrone Birkwood in clockwise direction (2.75 miles or 4.5 km). As the path is narrow and uneven, and crosses several burns, sturdy footwear is required.

This self-guided walk is done after rain or in the morning when dew has not yet evaporated and the mosses will be at their most vibrant. Your experience will also be enhanced if you have a x10 hand lens or magnifying glass or are able to take good close-up photos with a camera or phone.

A first look

From the car park at the Duck Pond, walk to the signpost and follow in the direction of the Morrone Birkwood Circular. Go through the entrance gate and turn left at the junction. Go straight on at the crossing and continue in this direction when a track joins from the left. Pass a house on the left hand side and stop when you reach open birchwood on both sides of the track (NO14193 90651)

Ptilium crista-castrensis

Hylocomium splendens in dry weather 1

The ground below the birch and juniper trees is covered in a thick carpet of mosses. Based on colour and texture, how many moss species can you distinguish?

Like plants, mosses have a stem-and-leaf structure, and they are green as they contain chlorophyll for photosynthesis. Most mosses, however, are much smaller than plants, and rather than reproducing through seeds, they reproduce by way of spores.

Morrone Birkwood is designated a Site of Special Scientific Interest (SSSI) partly because of its bryophytes assemblage. Characteristic moss species in upland birchwood and moorland are *Hylocomium splendens* and *Ptilium crista-castrensis*. Can you find these species here on the woodland floor?

Pinnate branching and hooked leaves
Continue along the circular route and ignore the track that veers off to the left. Where signposted, leave the main track that winds uphill to turn right onto a narrow, but level path.


Thuidium tamariscinum

While you walk along this path through birch and juniper wood, note the many species of moss on the woodland floor that weave through the vegetation. These weft-forming mosses often have distinctive branching patterns. *Ptilium crista-castrensis*, for example, is pinnately branched with branches standing at right angles to the main stem. Compare this the bi-pinnate branching of *Hylocomium splendens* and note how the branches themselves are branched. *Thuidium tamariscinum*, another typical moss of broadleaved woodland, takes this a step further with its tri-pinnately branching pattern.


Rhytidiadelphus triquetrus

The shape of the leaves of mosses may vary as well. The scruffy-looking *Rhytidiadelphus triquetrus* has straight leaves, while the fleshy-looking *Pseudoscleropodium purum* has concave leaves. Many of the species we will find on our walk have leaves that curl under, which makes shoots look hooked. A good example of this is *Hypnum cupressiforme,* a species that grows on some of the dead wood along this path.

Pseudoscleropodium purum

Hypnum cupressiforme

A base-rich flush

Continue along the path until you reach an open area with a flush on your left hand side (NO13839 90343).

In this area, water trickles down the slope over small boulders and bare peaty ground. Though most flushes in the Cairngorms are acidic, a band of lime-rich rock on the northern slopes of Morrone makes the water in this flush basic. Basic flushes are important for so-called brown mosses such as *Campylium stellatum* which has star-shaped and see-through, brown shoots. Other indicators that the water flowing down the slope is base-rich are the bright green thallose liverwort *Pellia endiviifolia* that can be seen at the foot of the slope, and the deep crimson bog-moss *Sphagnum warnstorfii* that forms larger hummocks in between, and at the side of, the flush.

Campylium stellatum

The diversity of mosses and liverworts in woodland and moorland is depends on the diversity of habitats and niches present. Basic flushes in particular can be very rich in species. Just look at the colour and texture of the mosses and liverworts in this flush and appreciate how different these are from the colours and textures of the mosses in the birchwood.

Sphagnum warnstorfii

Pellia endiviifolia

Water relations

Continue along the path and go through the gate.

As you enter the increasingly open moorland, look out for *Polytrichum commune* in damper areas, and sprigs of *Pleurozium schreberi* in between other mosses.

Polytrichum commune

Continue along the path until you reach a pool on your left hand side (NO12892 90213).

When picking up moss, you will notice that most are only loosely attached to the surface they are growing on, if at all. Unlike plants, mosses lack roots to absorb water from the soil. The bottle-brush looking *Polytrichum commune* has a tough, almost woody stem, which is thought to help with transport of water up and down the stem. Most mosses, however, lack the capacity to store water and nutrients between cells and instead have adaptations to store water externally. For example, both *Pseudoscleropodium purum* and *Pleurozium schreberi* have concave leaves that create spaces where water can be retained.

Pleurozium schreberi

Mosses among heather

Walk on until you reach the signpost. This is the furthest point of the walk. Turn around and admire the views. (NO12787 90174)

In mature heathland, as is the case here in Morrone Birkwood, the heather canopy is almost entirely closed. Beneath this canopy the microclimate is shaded and humid, and this suits mosses. On bare soil on the side of the path, or beneath the heather, you may, for example, find some of the weft-forming moss *Hypnum jutlandicum*.

Hypnum jutlandicum

As their presence moderates temperature and moisture levels and the amount of light that reaches the moorland floor, mosses influence moorland vegetation. They also contribute to the formation of a layer of organic matter on the ground which, in turn, helps to capture nutrients from rain and snow. In addition, the presence of *Hylocomium splendens* is known to encourage heather to sucker.

Can you find some *Hypnum jutlandicum*?

Bog-mosses

Turn right at the signpost and walk on until you reach a boggy area with several small pools. (NO12780 90334).

Sphagnum subnitens

Bog-mosses are the main constituent of – no surprise! – raised and blanket bogs, but they will also form the occasional hummock below heather. Though some blend in with the ochre grasses, many bog-mosses are vividly coloured. Their pigmentation, however, may fade and they may look much greener where shaded. *Sphagnum subnitens*, a bog-moss that is greenish in the centre of the top of each shoot and pinkish around it, forms flat-topped hummocks. *Sphagnum capillifolium* is vividly red in the centre but fades towards the edges. The top of the shoots of this species resembles cauliflower florets and this gives the hummock a much bumpier appearance. What bog-mosses have in common, however, is their capacity to absorb up to twenty times their body weight in water.

Sphagnum palustre

Sphagnum capillifolium

Which *Sphagnum* species can you find in this boggy area and below the heather?

Hairpoints

Continue along the path and ignore the two narrow paths that veer off to the left. Stop at the conspicuous boulder on the left side of the path. (NO12985 90476)

Racomitrium lanuginosum

In the Cairngorms, boulders and bedrock are a common component of moorland, and these are often good habitat for mosses. Have a good look at this boulder. How many species of moss can you see?

The cushion-forming growth form and hairpoints of the moss species on this boulder are adaptations to the exposed conditions they grow in. Sun and wind leave mosses vulnerable to drying out quickly. During rain, water is stored in cushions where it is retained for longer than on the exposed surface of the moss. The hairpoints seen on many of the mosses on this rock slow down the movement of air just above the surface of the mosses, which, in turn, slows down the process of drying out.

Hedwigia stellata

Have another look at this boulder. Can you find any *Racomitrium lanuginosum* and *Hedwigia stellata*?

Mosses in birchwood

Continue along the path, passing at the foot of an area of exposed bedrock and continuing straight on when a path joins from the left. When crossing a small burn, look out for Campylium stellatum on the flushed rocks to the side of it. As you enter between the trees, stop at the boulder on the left hand side of the path. (NO13647 91055)

Though often unnoticed, mosses are everywhere. During this self-guided walk we have seen the contribution they make to both the woodland and moorland ecosystems by capturing nutrients, contributing to soil formation, and moderating the soil temperature and humidity. Most of all, mosses play a role in absorbing water, and this is a particularly important service they provide in periods of heavy and prolonged rain as they help prevent flooding further downstream. Especially in the light of the increasing number of extreme weather events caused by climate change, we should celebrate our mosses.

Continue along the narrow path, cross another burn and go through a gate. Go straight on at the crossing and through the gate until you are back at the signpost where we started our walk.

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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