

LIVERWORTS generally have two rows of leaves, one up each side of the stem

Bazzania trilobata Greater whipwort



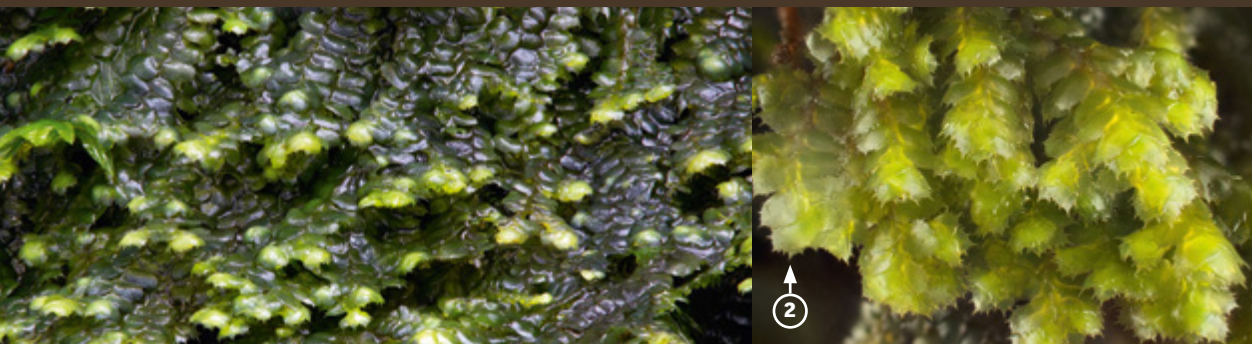
Habitat Often forming dense, mounded colonies on earth banks and around tree bases; also on boulders, rotten wood and occasionally on tree trunks.
Key characteristics **1** Long flagella protruding from underside of stem (sometimes inconspicuous in dense colonies)
2 Leaf tip with 2-4 (normally 3) teeth **3** Shoot with smooth, rounded back and tip appearing hooded.
Confusion species *Bazzania tricenata* Less than half the size of *B. trilobata* and far rarer.

Plagiochila spinulosa Prickly featherwort



Habitat In loose mats or dense cushions on trees and rock faces, often close to rivers and streams.
Key characteristics **1** Colour of colonies yellowish green **2** Leaves coarsely toothed around lower margin and tip, and with upper margin smooth **3** Leaf base runs down onto stem for a long distance.
Confusion species *Plagiochila punctata* Generally smaller and with a leaf base that runs down onto stem for a short distance.

Jubula hutchinsiae Hutchins' hollywort



Habitat Forming dark-bluish green wefts with yellowish green shoot tips, on vertical, shaded, wet rock faces beside streams.
Key characteristics **1** Colour of main colony matt bluish green **2** Leaves coarsely toothed **3** Leaves with lobe beneath.
Confusion species *Frullania* species. Reddish coloured and leaves not toothed.

Saccogyna viticulosa Straggling pouchwort



Habitat Usually creeping among other bryophytes on steep mossy banks and wet rock faces.
Key characteristics **1** Leaves in opposite pairs and without marginal teeth.
Confusion species No other liverwort of woodland has untoothed leaves in opposite pairs.

Plagiochila punctata Spotty featherwort



Habitat Often in dense, rounded cushions on trees and rock faces, often close to rivers and streams.
Key characteristics **1** Colour of colonies yellowish green **2** Leaves coarsely toothed around lower margin and tip, and with upper margin smooth **3** Leaf base runs down onto stem for a short distance.
Confusion species *Plagiochila spinulosa* Generally larger and with a leaf base that runs further down onto the stem.

Scapania gracilis Western earwort



Habitat Typically in dense, rounded cushions on humid rock faces and trees.
Key characteristics **1** Leaves very deeply bi-lobed, each leaf appearing to be two separate leaves **2** Upper leaf lobes semi-erect, giving a '3D' appearance **3** Leaves with fine teeth around the margins.
Confusion species Other *Scapania* species in woodlands have their leaf lobes held closely together, giving shoots a flatter and less '3D' appearance.

We are Plantlife

For over 25 years, Plantlife has had a single ideal – to save and celebrate wild flowers, plants and fungi. They are the life support for all our wildlife and their colour and character light up our landscapes. But without our help, this priceless natural heritage is in danger of being lost.

From the open spaces of our nature reserves to the corridors of government, we work nationally and internationally to raise their profile, celebrate their beauty and to protect their future.

Where wild plants lead Wildlife follows



Patron: HRH The Prince of Wales

Plantlife, Brewery House, 36 Milford Street,
Salisbury, Wiltshire SP1 2AP
01722 342730
enquiries@plantlife.org.uk

www.plantlife.org.uk

Plantlife is a charitable company limited by guarantee.
Company no. 3166339. Registered in England and Wales, charity no. 1059559. Registered in Scotland, charity no. SC038951.

The identification accounts in this guide were written by Des Callaghan, with the remaining based on text written by Gordon Rothero for Plantlife Scotland, and additions and amendments by Dave Lamacraft.
Photographs ©Des Callaghan 2015

ISBN: 978-1-910212-68-4
©Plantlife, September 2018
Design by rjpdesign.co.uk
Printed by Blackmore, Shaftesbury, Dorset

Printer's
FSC logo
to go here

This guide has been produced as part of the Looking Out for the Small Things project, which has been kindly funded by the Heritage Lottery Fund, with contributions from the Cumbria Community Foundation, Crofton Trust Fund and the Barbara Whatmore Charitable Trust.

Further information

Books

Mosses and Liverworts of Britain and Ireland: A Field Guide by Ian Atherton, Sam Bosanquet and Mark Lawley (British Bryological Society, 2010). The best field guide.
The Liverwort Flora of the British Isles by Jean Paton (Harley Books, 1999). An in-depth guide to liverwort identification, for more advanced bryologists.
The Moss Flora of Britain and Ireland by A J E Smith (2nd edition, Cambridge University Press, 2004). An in-depth guide to liverwort identification, for more advanced bryologists.
Mosses and Liverworts by Ron Porley and Nick Hodgetts (Collins New Naturalist series, Harper Collins, 2005). A highly readable account of moss and liverwort ecology and habitats in Britain.
Atlas of British & Irish Bryophytes by Tom Blockeel, Sam Bosanquet, Mark Hill and Chris Preston (Pisces Publications Ltd, 2014). A detailed account of the distribution of bryophytes in Britain and Ireland.

Websites

www.britishbryologicalsociety.org.uk The British Bryological Society (BBS) has information on bryophytes, publications, field trips and web links.



LOTTERY FUNDED



Lake District
National Park



National
Trust



Mosses and liverworts of Atlantic Woodlands in the Lake District



This guide is for anyone interested in identifying some of the more conspicuous mosses and liverworts of Atlantic woodlands, aiming to provide the tools needed to identify ‘good’ and potentially important bryophyte habitat. It looks at some of the more common species, as well as those that are characteristic or indicative of good Atlantic woodland.

What are mosses and liverworts?

Mosses and liverworts (collectively known as bryophytes) are some of the oldest land plants evolving over millions of years and colonising almost all habitats apart from the oceans. Most have a simple structure, with a main stem and branches covered in leaves. They do not have roots like plants, but absorb water and minerals directly using various structures on the stems and leaves. Although they can be red or purple, most are varying shades of green. The difference between mosses and liverworts is in their structure – mosses mainly have leaves all around the stem, whereas liverworts generally have two rows of leaves, one up each side of the stem (although some have no leaves at all) and tend to be smaller and more delicate.

What are Atlantic woodlands?

Atlantic woodlands are natural or semi-natural woodlands found in western Britain and Ireland, where the climate is mild and wet due to the influence of the Gulf Stream. These conditions are ideal for a range of important mosses and liverworts. Atlantic woodlands have been compared to tropical rainforests when there is also a luxuriant growth of lichens, ferns, mosses and liverworts, and are actually a type of ‘temperate’ rainforest. In fact, our Atlantic woodlands have become known as the Celtic Rainforest.

Why are the Lake District’s Atlantic woodlands so important for mosses and liverworts?

The quantity and frequency of rainfall, cascading streams and rivers, clean air and the wild landscape with its crags, ravines and boulders beneath an extensive tree canopy make the Atlantic woodlands of western Britain an internationally important habitat for mosses and liverworts.

Woodland mosses and liverworts are an excellent indicator of the quality of the habitat and play an important role in the woodland ecosystem. The UK has over 1,000 species of moss and liverwort, and our Atlantic woodland has as great a diversity of these as almost anywhere else on the planet. This diversity includes a number of species that are rare, both in Europe and globally, some of which are listed in Section 41 of the Natural Environment Research Council (NERC) Act.

Finding and identifying mosses and liverworts

And now for the exciting bit... Arm yourself with a hand lens (x10 and a x20 if available) and get out into the woods! While it can be tricky and a little daunting at first, you’ll find that you can become familiar with many species surprisingly quickly. There are some clues that will help you – in particular, look at where they are growing, for example...

Woodland floor including earth banks, over boulders and on tree bases

Mosses Bank haircap (*Polytrichum formosum*), common tamarisk-moss (*Thuidium tamariscinum*), five-ranked bog-moss (*Sphagnum quinquefarium*), glittering wood-moss (*Hylocomium splendens*), greater fork-moss (*Dicranum majus*), slender mouse-tail moss (*Isoetecium myosuroides*), little shaggy-moss (*Rhytidiadelphus loreus*), red-stemmed feather-moss (*Pleurozium schreberi*).
Liverworts Greater whipwort (*Bazzania trilobata*).

Rock faces, especially those near rivers and streams

Mosses Prostrate signal-moss (*Sematophyllum demissum*).
Liverworts Prickly featherwort (*Plagiochila spinulosa*), spotty featherwort (*Plagiochila punctata*), straggling pouchwort (*Saccogyna viticulosa*), western earwort (*Scapania gracilis*).

Tree trunks

Mosses Slender mouse-tail moss (*Isoetecium myosuroides*).
Liverworts Prickly featherwort (*Plagiochila spinulosa*), spotty featherwort (*Plagiochila punctata*), western earwort (*Scapania gracilis*).

The other key things to look at when identifying mosses and liverworts are the colour (paying attention to the particular shade of green), the shape of the leaves – eg, are they broad or narrow, pointed or blunt tipped? – the nerve (in the mid-rib of the leaf) and the way the leaf attaches to the stem.

Finally, please submit any records you have to the British Bryological Society (website, www.britis hbryologicalsociety.org.uk). Although common names have been used in this guide, scientific names should always be used when recording bryophytes to avoid ambiguity.

MOSSES mainly have leaves all around the stem

Dicranum majus Greater fork-moss



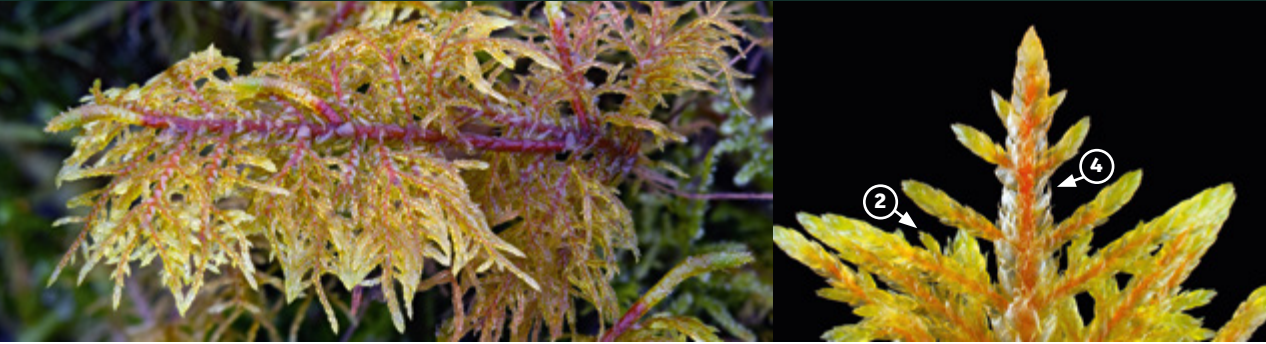
Habitat In loose patches on steep earth banks, around the base of trees and on thin soil over boulders.
Key characteristics **1** Shoots unbranched, standing upright and in loosely aggregated colonies **2** Leaves curved, tapering to a very long, fine tip and all pointing in one direction **3** Leaves with clear nerve **4** Stem tomentose.
Confusion species *Dicranum scoparium* Leaves more erect and much shorter (half the length of *D. majus*) and generally forming denser colonies (this species is more common than *D. majus*).

Pleurozium schreberi Red-stemmed feather-moss



Habitat Generally in loose, sometimes dense, patches on earth banks, around tree bases, over low boulders and across open ground.
Key characteristics **1** Stem red **2** Branches off main stem without their own smaller branches (1-pinnate) **3** Leaves without clear nerve **4** Leaves on main stem bluntly pointed.
Confusion species *Hylocomium splendens* Branches off main stem with their own smaller branches (2- and 3-pinnate) and leaves on main stem with sharp and wavy points.

Hylocomium splendens Glittering wood-moss



Habitat Generally in loose, sometimes dense, patches on earth banks, around tree bases and over low boulders.
Key characteristics **1** Stem red **2** Branches off main stem with their own smaller branches (known as 2-pinnate), some of which have further branches (3-pinnate) **3** Leaves without clear nerve **4** Leaves on main stem with sharply pointed and wavy tips.
5 Stem leaves far bigger than branch leaves.
Confusion species *Pleurozium schreberi* Leaves on main stem bluntly pointed and branches off main stem without their own branches (1-pinnate).

Polytrichum formosum Bank haircap



Habitat Typically on earth banks, on the woodland floor and around the bases of trees, often forming large and dense cushions.
Key characteristics **1** Shoots erect, unbranched and usually in densely aggregated colonies **2** Leaves long, narrow and sharply pointed **3** Shoots with a ‘bottle brush’ appearance **4** Basal sheath of leaf slightly longer than wide (viewed with a hand lens after pulling a leaf away from the stem).
Confusion species *Polytrichum commune* Basal sheath of leaf much longer than wide (less common than *P. formosum* in woodland, although often frequent).

Isoetecium myosuroides Slender mouse-tail moss



Habitat Typically forming dense, often mounded colonies that cloak trees and boulders, usually very abundant.
Key characteristics **1** Leaves with a clear central nerve and tips that are long and sharply pointed **2** Main stem without branches below and densely branched above **3** Colonies plain green or yellowish green.
Confusion species *Isoetecium holtii* Colonies usually with a bronzy-brown colour. *Isoetecium alopecuroides* Short pointed leaf tips.

Rhytidiadelphus loreus Little shaggy-moss



Habitat Often abundant, forming springy carpets over woodland floor, bases of trees, earth banks and over low boulders.
Key characteristics **1** Stem red **2** Leaves pleated and without a clear nerve **3** Leaves broad at base, tapering to a long fine point **4** Leaves at main shoot tip curved in same direction. **5** Branches off main stem without their own smaller branches (1-pinnate).
Confusion species *Rhytidiadelphus squarrosus* Leaves at main shoot tip not all curved in same general direction (usually much less common than *R. loreus* in oceanic woodland).

Sphagnum quinquefarium Five-ranked bog moss



Habitat Typically forming blankets and hummocks on earth banks.
Key characteristics **1** Sometimes pure green but often with some pinkish brown colour and red flecks **2** Branches along main stem in bunches of usually five, with three spreading away from stem and two pressed closely to the stem **3** Leaves on branches arranged in clear rows.
Confusion species Other woodland Sphagnum species with pinkish colours have two spreading branches per fascicle or do not have leaves arranged in clear rows.

Thuidium tamariscinum Common tamarisk-moss



Habitat Forming scruffy patches on earth banks, on the woodland floor and around the bases of trees.
Key characteristics **1** Stem brownish or greenish (not red) **2** Branches off main stem with their own smaller branches (2-pinnate), some of which have further branches (3-pinnate) **3** Leaves on main stem much bigger than leaves on adjacent branches **4** Leaves on main stem pleated, tapering to a sharp point and with a clear nerve **5** Stem covered in a tomentum.
Confusion species *Thuidium delicatulum* Tending to form shorter and denser turfs, but has to be confirmed with a microscope (much less frequent than *T. tamariscinum*).

GLOSSARY

Basal sheath The lower part of the leaf where it clasps the stem
Bi-lobed Divided into two leaves or segments
Falcate Strongly curved and turned to one side
Fascicle Group of branches
Flagella A whip-like structure dangling from beneath a leaf or stem
Lobe The larger segment of a divided leaf
Nerve The central vein-like structure in the mid-rib of the leaf
Pinnate With numerous, spreading branches on opposite sides of the stem, like a feather.
 1-pinnate refers to the branching pattern – 1 tier of branching from the main stem
 2-pinnate 2 tiers of branching
 3-pinnate – 3 tiers of branching
Pleated Creased or folded
Shoots The main stem plus leaves
Tomentose Closely covered in fine hairs
Tomentum A covering of fine hairs
Toothed With points, or ‘teeth’ around the margin of the leaf

