



Rock Fingerwort *Lepidozia cupressina*



Habitat: acidic rocks, tree bases, and on fallen decaying wood e.g. logs
Growth habit: forms dense cushions or mats
Key characteristics: 1. Mid-green, whitish when dry 2. Stems covered with tightly packed overlapping leaves so the stem is not visible from above 3. Each individual leaf is tipped with four or five narrow finger-like lobes
Similar species: similar to other *Lepidozia* species e.g. *L. reptans* but these have well-spaced not overlapping leaves
Notes: rare

Brown Scalegwort *Radula aquilegia*



Habitat: very humid wet rock faces, rarely on trees, in humid ravines
Growth habit: forms small patches closely pressed to the substrate
Key characteristics: 1. Reddish-brown or olive-brown, occasionally coppery or green 2. Smaller lower lobe bent upwards underneath the upper lobe forming a rectangular pouch 3. Concave lobes giving the shoots a 'puffed-up' appearance
Similar species: other brown *Radula* species but these tend to lack the 'puffed-up' appearance, looking smaller and flatter. Other *Radula* species are pale green. Looks similar to *Frullania* species but they also lack the 'puffed-up' appearance
Notes: rare

Prickly Featherwort *Plagiochila spinulosa*




Habitat: in loose mats or dense cushions on trees and rock faces, often close to rivers and streams
Growth habit: a small mat-forming liverwort
Key characteristics: 1. Colour of colonies pale or yellowish green when wet, browner when dry 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
Similar species: *Plagiochila punctata*; generally smaller and with a leaf base that runs down onto stem for a short distance. Found growing on trees more frequently than *P. spinulosa*. Other small *Plagiochila* species are also similar
Notes: uncommon

Stragglng Pouchwort *Saccogyna viticulosa*




Habitat: steep mossy banks and wet rock faces
Growth habit: forms patches but usually creeps among other bryophytes
Key characteristics: 1. Rounded leaves in opposite pairs and without marginal teeth 2. Older parts of the shoot are often brownish
Similar species: no other liverwort in this habitat has untoothed leaves in opposite pairs
Notes: common

Deceptive Featherwort *Pseudomarsupidium decipiens*



Habitat: on rocks, rarely on trees, in shaded habitats
Growth habit: forms small cushions
Key characteristics: 1. Dark green, brownish when dry 2. Leaves round and somewhat concave with two or three widely spaced teeth on the margin 3. The paler young leaves at the stem tips are often pressed vertically together
Similar species: similar to *Plagiochila* species e.g. *P. punctata* but the dark colour and widely spaced teeth are good characters
Notes: uncommon

Western Earwort *Scapania gracilis*



Habitat: humid rock faces and trees
Growth habit: typically in dense, often large (for a liverwort), untidy looking cushions
Key characteristics: 1. Pale brownish-green in colour 2. Leaves very deeply bi-lobed, each leaf appearing to be two separate leaves 3. Upper leaf lobes stick up and out, away from the stem 4. Leaves with fine teeth around the margins
Similar species: other *Scapania* species in woodlands have their leaf lobes held closely together, giving shoots a flatter appearance. *S. nemorea* is greener without the brown tinge and has brown gemmae – appearing as brown dots – on the tips of the leaf lobes
Notes: uncommon

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Glossary

Basal sheath: the lower part of the leaf where it clasps the stem
Bi-lobed: divided into two leaves or segments
Capsule: the capsule contains the spores and sits at the end of a stem (seta)
Falcate: strongly curved and turned to one side
Flagella: a whip-like structure dangling from beneath a leaf or stem
Gemmae: cells or small buds of tissue which detach and form new individuals as a means of asexual reproduction
Lobe: the larger segment of a divided leaf
LOBULE: a small lobe, typically the smaller segment of a larger 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
Substrate: the surface on which the plant is growing e.g. rock, tree, soil
Tomentose: with a tomentum
Tomentum: a covering of fine hairs
Toothed: with points, or 'teeth' around the margin of the leaf

Further Information

Mosses and Liverworts of Britain and Ireland: A Field Guide.
 Ian Atherton, Samuel D. S. Bosanquet and Mark Lawley (2010).
 A user-friendly guide to identifying mosses and liverworts in the field.

Guide to Mosses and Liverworts of Woodland.
 Martin Godfrey (2014).
 An accessible FSC guide to some of the commoner woodland species.

A Field Guide to Bryophytes
 Dominic Price and Clive Bealey (2022).
 A beginner-friendly guide that covers 133 species of moss and liverwort encountered in most UK habitats.

www.britishbryologicalsociety.org.uk
 The website of the British Bryological Society which promotes the study of mosses and liverworts.



Mosses and Liverworts of Wales' Rainforest



Mewn Partneriaeth â Llywodraeth Cymru
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This guide is for anyone interested in identifying some of the more conspicuous mosses and liverworts of temperate rainforest in Wales, aiming to provide the tools needed to identify some of the more common species, as well as those that indicate good temperate rainforest habitat.

What is temperate rainforest?

Temperate rainforest is globally rare. It occurs where the climate is mild and wet; suitable climatic conditions are found over less than 7% of the earth's surface.

Temperate rainforest is particularly characterised by a luxuriant growth of lichens, bryophytes¹ and ferns, many of which are highly specialised and only, or mostly, found in temperate rainforest.

In Britain, it is found in the west where the climate is mild and wet due to the influence of the Gulf Stream. It occurs throughout the landscape as woodland, wood pasture and scattered trees. Human interaction with the landscape over millennia has shaped what we have today, and what remains is internationally important in terms of the habitat itself and the species it supports.

Across Britain rainforest varies according to climate; lowland temperate rainforest occurs in West Scotland and in pockets of Cumbria and North Wales, reflecting wetter climatic conditions, whereas upland rainforest is more widespread. Where conditions are drier and sunnier oceanic woodland becomes more prevalent. Our use of the term 'rainforest' here encompasses true rainforest and oceanic woodland as they often occur alongside each other across the rainforest landscape.

What are mosses and liverworts?

Mosses and liverworts (collectively known as bryophytes, along with hornworts) are some of the oldest land plants, evolving over millions of years and colonising almost all terrestrial habitats. 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 structures on the stems and leaves.

The difference between mosses and liverworts is in their structure; mosses have leaves all around the stem, whereas liverworts generally have two rows of leaves, one up each side of the stem and tend to be smaller and more delicate.

Why are the mosses and liverworts of temperate rainforest so important?

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 temperate rainforest of western Britain an internationally important habitat for mosses and liverworts.

They are excellent indicators 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 temperate rainforest is particularly rich and diverse; the best sites can have over 150 species.

How to use this guide

Arm yourself with a x10, and ideally a x20, hand lens 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.

Key things to look at when identifying mosses and liverworts are:

- their colour, paying attention to the particular shade of green
- the shape of the leaves including the tip e.g. are they broad or narrow, pointed or blunt tipped?
- the nerve, in the mid-rib of the leaf
- the way the leaf attaches to the stem
- where they are growing e.g. on the woodland floor, on rotting wood, on tree bases, tree trunks, rocks etc.

The species accounts detail:

- species that are indicators of good quality temperate rainforest habitat (marked with a ★), look out for these when undertaking a Rapid Rainforest Assessment
- how common each species is in temperate rainforest habitats
- their main habitat
- their growth habit
- the key ID characters
- the main confusion species

Although common names have been used in this guide, scientific names should always be used when recording bryophytes to avoid ambiguity.

Please submit any records you have to the British Bryological Society.

Mosses; leaves all around the stem

Scott's Fork-moss *Dicranum scottianum*



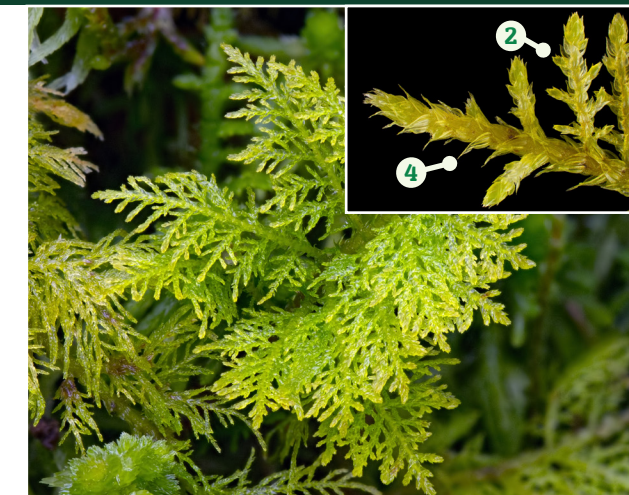
Habitat: shaded acid rocks, occasionally trees
Growth habit: often forming dense cushions
Key characteristics: 1. Dark green, occasionally mid- or yellowish-green e.g. when dry 2. Leaves very erect or slightly curved, spearhead-shaped and tapering to a long fine point 3. Very obvious nerve 4. Leaves mostly un-toothed 5. Capsule erect and straight
Similar species: *Dicranum fuscescens*; toothed leaves and a curved capsule
Notes: uncommon

Bank Haircap *Polytrichum formosum*



Habitat: typically on earth banks, on the woodland floor and around the bases of trees, often forming large and dense cushions
Growth habit: robust upright shoots forming loose tufts
Key characteristics: 1. Shoots upright, 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)
Similar species: *Polytrichum commune*; basal sheath of leaf much longer than wide and less common than *P. formosum* in woodland
Notes: common

Common Tamarisk-moss *Thuidium tamariscinum*



Habitat: earth banks, on the woodland floor and around the bases of trees
Growth habit: forms loose spreading mats, often with a scruffy look
Key characteristics: 1. Stem brownish or greenish 2. 2-3 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 tomentum
Similar species: *Thuidium delicatulum*, tending to form shorter and denser turfs, but has to be confirmed with a microscope (much less frequent than *T. tamariscinum*)
Notes: very common in a wide range of habitats

Glittering Wood-moss *Hylocomium splendens*



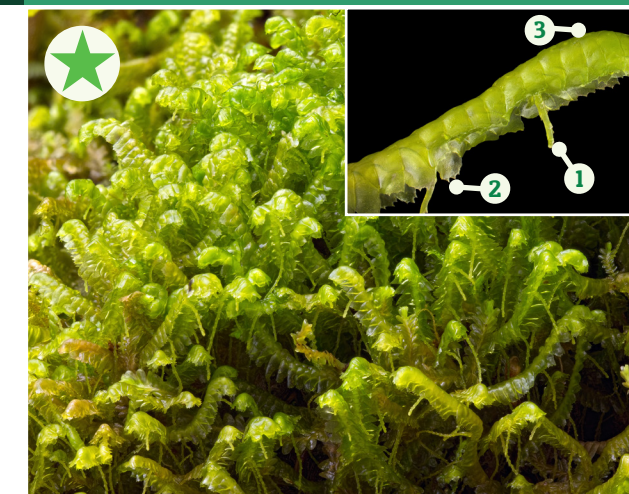
Habitat: earth banks, tree bases and over low boulders
Growth habit: generally in loose spreading patches
Key characteristics: 1. Stem red 2. 2-3 pinnate 3. Leaves without clear nerve 4. Leaves on main stem with sharply pointed and wavy tips 5. Stem leaves far bigger than branch leaves
Similar species: *Pleurozium schreberi*, leaves on main stem bluntly pointed and 1-pinnate
Notes: very common

Little Shaggy-moss *Rhytidiadelphus loreus*



Habitat: on the woodland floor, bases of trees, earth banks and over low boulders
Growth habit: forms spreading untidy, loose, springy mats
Key characteristics: 1. Stem red 2. Leaves curved without clear nerve 3. Leaves broad at base, tapering to a long fine point 4. Leaves at main shoot tip curved in same direction i.e. falcate 5. 1-pinnate
Similar species: *Rhytidiadelphus triquetrus*; typically larger with leaves that stick out in all directions making it look shaggy. *Rhytidiadelphus squarrosus*; leaves at main shoot tip not falcate (usually much less common than *R. loreus* in temperate rainforest)
Notes: very common in a range of habitats

Greater Whipwort *Bazzania trilobata*



Habitat: earth banks, tree bases, boulders, rotten wood, occasionally on tree trunks
Growth habit: dense, mounded colonies
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 with hooded appearance
Similar species: *Bazzania tricrenata*; less than half the size of *B. trilobata* and far rarer
Notes: common

Mouse-tail Moss *Isoetes myosuroides*



Habitat: tree trunks and boulders
Growth habit: typically forming dense mats
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 4. A tree-like growth form, apparent when you pull up a stem or separate it from the rest
Similar species: *Isoetes holttii*; colonies usually with a bronzy-brown colour and is more robust. *Isoetes alopecuroides*; short egg-shaped leaves broadly pointed at the tips
Notes: very common in a wide range of habitats

Five-ranked Bog-moss *Sphagnum quinquefarium*



Habitat: usually on well-drained ground e.g. on banks
Growth habit: typically forming soft cushions, hummocks or a carpet over the substrate
Key characteristics: 1. Sometimes pure green but often with some pinkish brown colouration 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
Similar species: there are many species of *Sphagnum* and they are hard to identify. The characters above, especially the number of branches in a bunch on the stem, will give good pointers to this species. Other woodland *Sphagnum* species with pinkish colours include *S. subnitens* and *S. palustre*
Notes: common

Tamarisk Scalewort *Frullania tamarisci*



Habitat: rocks and trees
Growth habit: forms widely spreading patches usually closely pressed to the substrate but sometimes bushy
Key characteristics: 1. Usually a reddish or coppery brown, sometimes greener at the shoot tips 2. Leaf egg-shaped, sometimes with a more pointed tip 3. Small helmet-shaped lobule (longer than wide) at the base of the main lobe (look from underneath) 4. Line of darker cells up the middle of the main leaf lobe (visible with a hand lens)
Similar species: *F. dilatata* has rounded (not pointed) lobes, larger lobules which are also more rounded and is usually on trees. *F. teneriffae* is very similar but rarer and often coastal. Neither species have the line of darker cells in the middle of the main lobe
Notes: common

¹A collective term for mosses, liverworts and hornworts