

# Rapid Rainforest Assessment

Find out if woodland condition is beneficial  
for rainforest lichens, mosses and liverworts,  
and identify issues to inform management



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## Guidance notes

The Rapid Rainforest Assessment (RRA) has been designed to assess the condition of the UK's temperate rainforest. Temperate rainforest is a globally rare habitat characterised by high rainfall and mild, humid conditions. In Britain, it is restricted to western and upland coastal areas from Cornwall to Scotland. These woodlands are internationally important for their lichens and bryophytes (mosses and liverworts) and it is these taxa that are the defining features of the temperate rainforest habitat. Much of the UK's temperate rainforest is designated as Important Plant Areas (IPAs) because of its lichen and bryophyte interest.

Despite its conservation importance, temperate rainforest faces a range of threats from site-specific issues such as shading due to invasive species and/or lack of grazing by deer enclosure or removal of stock, to wider issues such as tree disease, air pollution and climate change. Plantlife is working with land managers, woodland owners and local communities to better understand temperate rainforest and improve its conservation.



Distribution of temperate rainforest in UK



### By carrying out the RRA you will:

- Understand the condition of a woodland and its potential to support temperate rainforest lichens and bryophytes.
- Identify site-specific threats to lichen and bryophyte communities, which can inform conservation management.

The RRA survey form can be found [here](#). Based on the answers you give on the form, you will be directed to relevant sections of our online management guidance: **Rainforest lichens and bryophytes - a toolkit for woodland managers**. For each section in the survey you will also gain a score that can be added up at the end to provide insight into the current condition of your site for temperate rainforest lichens and bryophytes.

## What are the features of a good temperate rainforest?

Temperate rainforest is a varied habitat – dominant tree species vary depending on soil type, topography and climate. Woods may be dominated by oak, ash, alder, scots pine, willow or hazel. They might be wood pasture with trees widely spaced, or high forest with mosaics of more closed canopies interspersed with rides and glades; they can be nestled in sheltered valley bottoms or growing precipitously down ravines. This means it is impossible to be prescriptive about the tree species that make a ‘good’ temperate rainforest habitat, the size or frequency of open space that should be present, or the volume of dead wood, for example.

However, what is common to all temperate rainforest sites that support a rich flora of lichens and bryophytes is heterogeneity – they possess a diverse structure with areas of light and shade, a diversity of tree ages with varying bark characteristics and microhabitats, a diversity in the structure of the field layer with patchiness providing a range of open and more sheltered conditions, a diversity of dead wood and rocky substrates in both shaded and well-lit situations.

### How will the RRA help me put this into practice?

The RRA will help you understand:

- What lichen and bryophyte interest is present at your site
- Where that interest is located
- Where it could be in future (i.e. where important habitat features are)

- What management issues could be affecting lichens and bryophytes, both where they currently are and where they have potential to be.

This information is key to managing temperate rainforest for its specialist lichens and bryophytes. Woodland managers should aim for a range of conditions in the wood, i.e. open and closed canopy, diverse age structure etc. but should always be informed by the location of existing lichen and bryophyte interest as well as features of interest. Along watercourses that are often important for bryophytes, canopy cover should be retained. Around veteran trees, that have potential to support important lichen communities, more open conditions should be maintained or restored. In terms of prioritising management, management action should target areas where the most important lichen and bryophyte communities exist to ensure conditions are optimum for those, first and foremost.

The RRA should be used alongside any available survey reports on lichen and bryophyte species to better understand their distribution at your site (this may be current distribution if there is existing interest, but also historic distribution if you are restoring neglected woodland).

While the questions in this survey relate to features which are important for rainforest lichens and bryophytes, the same features – such as structural diversity, veteran trees and dead wood – are beneficial for many other taxa including fungi and invertebrates.

## Why are lichens and bryophytes special?

©Dave Lamcraft/Plantlife



### Lichens

Lichens are composite organisms comprising a fungal partner, at least one photosynthetic partner (usually an alga, or sometimes a cyanobacterium) as well as yeasts and bacteria. They contain an array of chemical compounds which protect the lichen, helping it compete and survive. The UK's temperate rainforest is globally important for its lichens. They play a crucial role in the ecosystem, in the nutrient cycle and as a habitat and food source, and their chemical compounds have great biomedical potential.



### Bryophytes

Bryophytes are simple, spore-producing plants that include mosses and liverworts. They were among the first plants to colonise land, and lack a complex vascular system for transporting water and nutrients. Dependent on moisture absorbed directly through the surfaces of their leaves and stems, they thrive in the wettest places on earth. Over half of Europe's bryophyte species can be found in the UK, and our temperate rainforest bryophyte richness rivals that of tropical cloud forests.

## Carrying out the RRA

### What size area should you cover?

The RRA is designed to be a relatively quick and rough assessment of a site conducted during a walk. The results will give you an overview of the wood rather than being a detailed survey. If you are surveying a large woodland or a woodland with areas that have a distinctly different character (e.g. the topography, species composition or management is quite different), you might find it easier and more beneficial to divide the site up and complete several separate assessments. The survey could be carried out in woodland coupes or at several stations within a woodland compartment - whatever is appropriate to inform woodland management. We recommend you record the survey area on a map and use a GPS device to record 10-figure grid references for key habitat features, indicator species and management issues that you identify. This will aid in planning and executing management, and future re-survey.

### Before you begin

**You are responsible for your own health and safety. Ensure you follow the relevant operating procedures and risk assessments for your site/property/organisation.**

#### Equipment

- Survey form and guidance notes
- Plantlife's ID guides for bryophytes, lichens and ferns, relevant to your region of the UK.
- GPS device
- Map of site
- Camera
- Compass

### Where to do the survey

The RRA is designed for use in woodland that lies within the green areas on the map on page 2. These areas have the right climate to support temperate rainforest lichens and bryophytes. Whether a site actually supports rainforest species will depend on a range of other factors including woodland age and management history. The survey can be carried out on woodland in any stage of management or restoration, including woodland that is newly created, undergoing restoration, unmanaged or previously unsurveyed.

## Starting your survey

**At the start of your survey fill in the table at the top of the form including:**

- **Grid reference** for centre of survey area
- **Slope** enter 'flat', 'gentle' or 'steep' to give a rough idea of how steeply sloped the site is. If the slope varies, answer this based on what most of the survey area is like. You can provide a description of how the slope varies.
- **Main aspect:** this refers to the direction the slope of the site is facing. If the site is flat, leave blank. If the aspect varies, answer this based on what most of the survey area is like. You can provide a description of how the aspect varies.

Take a map of your site so you can mark on key features/indicator species during your survey.



©Stan Phillips (on behalf of the Alliance for Scotland's Rainforest)

## Indicator species

Throughout the survey you should keep a look out for indicator lichens, bryophytes and ferns, particularly around interesting habitat features mentioned in Section 3 of the survey.

We recommend you spend some time familiarising yourself with the indicator lichens and bryophytes for your region. For lichens and bryophytes, Plantlife has developed separate guides for Scotland, Wales, the Lake District and south-west England. For ferns there is one guide for the UK. The guides contain some very common species found in temperate rainforest as well as some less common ones. The tables at the back of these guidance notes highlight the species from the guides that are most indicative for each region. A good temperate rainforest site will have a range of species present.

Any indicator species you find can be recorded in the indicator species section on the survey form, along with a 10-figure grid reference, and details on abundance and where it is growing. Make sure you take photographs of any indicators you find. They can be used to verify identifications of important species. Ensure photographs are clear and in focus, and show all features that could be useful for identification. In some cases it might be helpful to take several pictures of the same species.



# 1 Woodland composition

## Tree species: record which tree species you see and how abundant they are

Use the DAFOR scale to record the abundance of each species in the canopy and then the understorey: D = Dominant (more than 75%), A = Abundant (50-75%), F = Frequent (25-50%), O = Occasional (10-25%), R = Rare (less than 10%). Note that you are estimating the proportion of the canopy that is made up of each species, and then the proportion of the understorey that is made up of each species. The abundance scores should approximate to around 100% for both the canopy and understorey respectively (this does not need to be exact).

## Which trees should be classed as 'canopy' and which should be classed as 'understorey'?

Whether a tree is classed as being in the canopy or understorey depends on its height in relation to other trees in an area of woodland.

Smaller trees such as hazel can be classed as canopy trees where they form the main canopy in an area of woodland (i.e. they aren't beneath a taller canopy). Understorey trees are those growing beneath the main layer of the canopy and can include saplings/young trees that may grow into the canopy as they mature, as well as smaller shrubs/trees that remain in the understorey.

### Understanding your tree composition results and what it means for management:

Once you have completed the DAFOR assessment, use the table on the survey form to interpret your results. This will enable you to calculate a woodland composition score, which will give you an indication of how suitable the tree composition currently is for rainforest lichens and bryophytes. You will also find specific management guidance for different scenarios.

### What will this tell you?

This helps you understand the available habitat and specific communities of lichen and bryophyte that a woodland might support. The tree species composition will influence the woodland structure and micro-climate, which along with the pH and smoothness of the tree bark, will influence the lichens and bryophytes that grow there. The indicator species tables at the end of these guidance notes provide information on the lichen communities associated with different tree species and bark pH.

A woodland with a mix of native trees tends to be best for supporting a range of lichens and bryophytes as they will have a greater variety of niches. However, an important exception are hazel-dominated woods where these have been undisturbed and had a long history of favourable, well-lit, conditions. These ancient stands of hazel can be some of the richest temperate rainforest for lichen biodiversity - especially if they have never been coppiced.

Recording the composition of the understorey tree layer can be helpful for understanding how the woodland is regenerating. This information can help predict whether the future make-up of the woodland will be similar to how it is now without intervention, or whether invasives, such as beech and sitka for example, need to be removed.

# 2 Woodland structure

## Tree age profile

Select the option on the form that best fits the whole area you are including in this assessment.

### What will this tell you?

A mixed age structure is important for a resilient rainforest - a mixture of mature trees, veteran trees and younger trees to replace them. Old trees tend to support a greater variety of lichens and bryophytes, and certain lichens will only be found on trees that are hundreds of years old, when the bark becomes fissured and dries out. Even-aged woods have fewer different substrates for lichens and bryophytes and tend to have more uniform closed canopies, limiting potential for regeneration and the development of epiphyte communities on tree trunks, boulders etc.

## Canopy cover and open space

Select the option that best fits the whole area you are surveying.

The photos below provide an indication of what some of the descriptions might look like.



Closed canopy with limited open space



Mosaic of closed and open canopy (with around 30% of the wood as open space).



Very open and well-lit conditions throughout, e.g. wood pasture.

### What will this tell you?

This will help you understand the structure of the woodland and how much light is reaching tree trunks and other microhabitats below the canopy. Light is a crucial factor for lichens in particular. Changing woodland management has led to woodlands becoming more shady, resulting in a loss of lichen diversity. It is important to note too, that while bryophytes prefer more humid conditions promoted by a closed canopy, very dense shade tends to result in less diverse bryophyte communities, as a few competitive mosses dominate. Woods with a mosaic of closed canopy and more open areas can be desirable for bryophytes under canopy cover and lichens in better-lit areas. Wood pasture, which is more uniformly well-lit, is desirable for many rare lichens.

## Field layer

### Bramble, ivy and bracken

Consider the whole area you are including in your survey and select the best fit from the options on the form. You can specify whether the cover is bramble, bracken or ivy, or a mixture of these.



Example of sparse bramble/ivy cover



Example of dense bramble cover

### What will this tell you?

Where the field layer cover of bramble, ivy and/or bracken is high it can mean they out-compete bryophytes on the woodland floor and shade lichens near the bases of tree trunks. It can be a sign of a lack of grazing/browsing.

### Heather, bilberry/blaeberry and woodrush

Consider the whole area you are including in your survey and select the option on the survey form that fits best. You can specify whether the cover is heather, bilberry/blaeberry, woodrush, or a mixture of these.



Moderate cover of heather and bilberry promoting the development of a rich bryophyte flora.

© Oliver Moore

### What will this tell you?

Moderate cover of heather, bilberry and/or woodrush in the field layer helps retain humidity, aiding the development of rich bryophyte communities. However, if growth becomes too dense and starts to cover tree bases (usually in the absence of adequate grazing and browsing) this can be detrimental as light and space become limited.

### Understanding your woodland structure results and what it means for management:

Total your score for this section to get an indication of how suitable the woodland structure currently is for rainforest lichens and bryophytes. You will also find management guidance for different scenarios in the results table for this section.

## 3 Habitat features

A diversity of habitat features in different situations are beneficial for lichens and bryophytes. In this section of the survey you will look for a range of key habitat features in four habitat feature categories (veteran trees, dead wood, rocky substrates and wet features). You will record which features are present, provide grid references as appropriate, and record any management issues affecting the features. Management issues may include shading from a dense canopy overhead or encroachment by the shrub layer (e.g. dense regeneration, invasive species or bramble growth). See **Rainforest lichens and bryophytes - a toolkit for woodland managers** for more details on these management issues.

Finally, score the overall abundance for each of the four feature categories (veteran trees, dead wood, rocky substrates and wet features) from 0–3 where 0 = none, 1 = rare (i.e. the features are present but uncommon/covering only a small part of the site), 2 = frequent (i.e. the features are not uncommon but neither are they very abundant), 3 = dominant (i.e. the features are very abundant/cover much of the site).

When you find a listed habitat feature, consider any indicator species that may be present. The indicator species tables at the back of these guidance notes list the key indicator species for your region, and show the habitat features they are associated with. This will help you hone in on some key species to look for in specific areas. More detail on important communities associated with these habitat features is also available in the lichen and bryophyte sections of **Rainforest lichens and bryophytes - a toolkit for woodland managers**.

### Dead wood

Dead wood provides an important substrate for both lichens and bryophytes with specialists that grow on lying dead wood and standing dead wood (both rotting stumps and standing dead trees). Bryophytes often require dead wood in humid and sheltered locations, whereas lichens require dead wood in well-lit locations. Record the types of dead wood present and the overall abundance of dead wood. You may want to record grid references if features occur in a particular area only, or are particularly good examples, though if dead wood features are abundant and widespread this might not be necessary. Note down any management issues such as dense shrub/field layers/invasive species overgrowing the features.

### Rocky substrates

Boulders and rock faces provide important substrates for lichens and bryophytes. As with dead wood, well-lit rocky substrates are likely to be more important for lichens, whereas rocks in more sheltered and humid spots are likely to be better for bryophytes. Record the features you find and the overall abundance of rocky substrates. It will be useful to record the location of rock faces and boulders unless they are spread throughout the site. If a feature such as boulders are widespread, a central 6-figure grid reference is sufficient. Note down any management issues – look out for overgrowth by dense regeneration, shrub or field layers that can prevent the growth of lichens and more specialist bryophytes.



©Alison Smith/Plantlife

### Wet features

Watercourses and wet areas tend to be the richest areas for bryophytes. The presence of ravines/waterfalls alone is likely to signal the presence of interesting bryophyte communities where these are not overgrown by dense shrubs and bramble. Record the features that are present, their location (e.g. a central grid reference), any management issues affecting them and the overall abundance of wet features in the survey area.



©Rachel Jones/Plantlife

## Veteran trees and veteran tree features

As trees age they become a richer habitat for lichens and bryophytes, with more varied niches. Trees often begin to develop veteran features well before they are considered veteran or ancient in terms of age. The table below gives an indication of when some common temperate rainforest tree species typically start to develop veteran features. Look out for features such as hollows, exposed wood, dead limbs etc. which provide varied substrates and microclimates for specialist epiphytes to thrive.

Record which features you find and provide grid references (use a central 6-figure reference where a feature covers a large area, and a 10-figure reference for more isolated examples). Consider whether there are any management issues affecting the features e.g. shade from dense overhead canopies or a dense shrub/field layer, which can inhibit the growth of lichens on trunks. Finally record an overall abundance for veteran tree features in the area you are surveying.



Exposed wood providing a niche for lichens that specialise on dry lignum



Old pollards and old coppice stools may be ancient with well-developed lichen communities where conditions around the trees have remained stable.



Dry underhang on an old oak, providing a sheltered environment for ancient dry bark community lichens.



Old undisturbed hazel woods with no coppice management can be home to specialist lichen communities relying on ecological continuity.

### Indicative age when trees from key species become veterans.

Alder	75-125 years
Ash	100-200 years
Birch	80-150 years
Hawthorn	100-200 years
Oak	150-300 years
Scots pine	125-200 years

Source: Ancient Tree Inventory

### **Understanding your habitat feature results and what it means for management:**

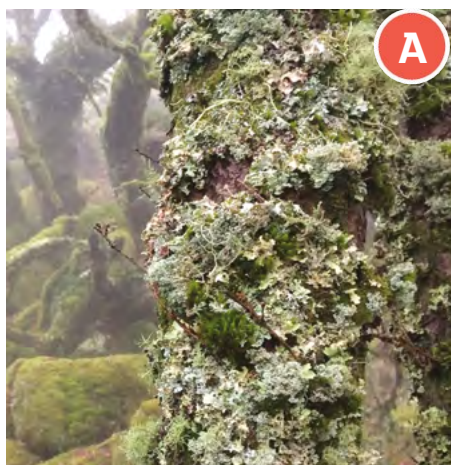
Total your score for this section to get an indication of how suitable the habitat currently is for rainforest lichens and bryophytes. You will also find specific management guidance for different scenarios in the results table for this section.

## 4 Lichens and bryophytes

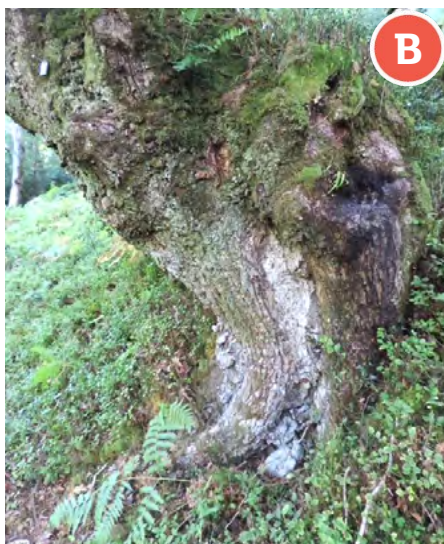
### Lichens on tree trunks

Assess the abundance of tree trunks and rocks with lichen growing on them. If most of the trunks and rocks are bare or covered with ivy or moss, this suggests a lack of light in the wood. If a large number of tree trunks and rocks have lichens growing on them, including some with luxuriant growth of leafy or bushy lichens, this is indicative of well-lit conditions (see Photo A).

When looking for lichens on tree trunks, look out for crust lichens that may resemble splashes of paint or powdery areas on bark (Photos B and C), as well as the bigger and more noticeable leafy and bushy lichen species (Photo A).



Trunk with luxuriant growths of leafy or bushy lichens (as found with good examples of the *Parmelion* lichen community on acid bark and rock, and the *Lobarion* lichen community on base-rich bark and rock).



Old oak tree with grey and white crust lichens on the dry bark of a rain-sheltered underhang - a sign of the ancient dry bark community.

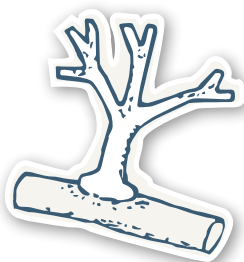


*Graphidion* (smooth-bark) lichen community on old hazel

©Dave Lamacraft

©April Windle

You can find more information on temperate rainforest lichen communities and how to recognise these in **Rainforest lichens and bryophytes: a toolkit for woodland managers**.



#### 'Bushy' lichens

Also known as fruticose lichens, they have many wispy thread-like or strap-like branches and a single point of attachment to their substrate. There is no obvious upperside or underside to the lichen.



#### 'Leafy' lichens

Also known as foliose lichens, they have leafy lobes that are attached at various points to their substrate but are loose at the edges (so the lichen could be peeled away). There is an obvious upperside and underside to the lichen.



#### 'Crust' lichens

Also known as crustose lichens, they form a crust on their substrate as though they have been painted on. They cannot be peeled away.

## Bryophyte cover on the ground

Assess the abundance of bryophytes growing on the woodland floor, including the ground, banks, dead wood and rocks.

Bryophytes are likely to be more abundant where the ground cover of other plants is more sparse or patchy, or where the field layer allows sufficient light and space for a luxurious bryophyte cover to develop beneath it (e.g. in the case of heather and bilberry/blaeberry).

Note that an abundance of bryophytes alone is not necessarily indicative of good temperate rainforest. Some conifer plantations are carpeted in mosses, but the species diversity is generally poor. In good quality rainforest, you would expect to see an abundance of liverworts such as *Scapania gracilis*, *Bazzania trilobata* and *Plagiochila* spp. amid common mosses like *Dicranum majus* (Greater Fork-moss), *Loeskeobryum brevirostre* (Short-beaked Wood-moss) and *Rhytidiadelphus loreus* (Little Shaggy-moss), for



©Cecile Chastre

Woodland floor and boulders carpeted with a range of bryophytes – an indication of high quality temperate rainforest.

example. You can find these species in the relevant moss and liverwort ID guide for your region. Record any of the indicators you find in the indicator species table on the form and remember to take photographs to verify your identifications.

### Understanding your lichen and bryophyte results and what it means for management:

Total your score for this section to get an indication of how suitable the site currently is for rainforest lichens and bryophytes. If bryophyte and/or lichen cover is limited, it is important to establish why. The other sections in the RRA will help with this. If bryophytes and/or lichens are being out-competed by a dense field/shrub layer then this should be addressed by increasing grazing or other suitable management if grazing is not possible. You will also find management guidance for different scenarios in the results table for this section.

## Indicator species

As highlighted at the start of these guidance notes, you should look out for indicator species during the survey. Any you find can be recorded in the indicator species table on the survey form, along with details of location and abundance. Take photographs for verification.

### What will this tell you?

The presence of a range of indicator lichen, bryophyte and fern species suggests good quality temperate rainforest, with a history of ecological continuity (i.e. the woodland has not changed and has had conditions that are favourable for a long period of time). Lichen and bryophyte communities can take a long time to establish but if conditions change they can quickly decline and be lost from an area. Inappropriate coppicing, for example, can decimate lichen interest on old hazel by completely removing the lichen resource. Over slightly longer periods the development of dense shading from non-native invasives or infilling by native species such as birch or holly, for example, can make conditions unsuitable in relatively short time frames.

## 5 Grazing/browsing

**Use the table on the survey form to assess the levels of grazing and browsing at your site to establish whether they are too high, moderate (often desirable) or too low. Look at each woodland feature in turn: tree regeneration, young shoots on hazel, bramble, bryophytes and boulders. Then consider all of these factors together to reach a decision about the grazing/browsing level.**

A moderate level of grazing/browsing is a key feature of temperate rainforest that is rich in lichens and bryophytes. For lichens and bryophytes to survive long-term it is important that there is some tree regeneration (for continuity of habitat) but mass regeneration indicates a lack of grazing/browsing and can lead to the loss of sensitive lichens and bryophytes, growing on established trees, through excessive shading.

Where grazing/browsing levels are moderate, the ground should be dominated by bryophytes but with vascular plant growth present. If the ground is dominated by vascular plants this indicates that grazing is too low, such that bryophytes are being smothered. In contrast, a field layer denuded of vascular plants altogether (besides bracken) indicates a grazing/browsing level that is too high.

### **Understanding your grazing/browsing result and what it means for management:**

For this section you will get a score of either -3 (grazing/browsing is too high), +3 (grazing/browsing is moderate (often desirable), or 0 (grazing/browsing is very low which may be undesirable or desirable depending on the circumstances). Management recommendations for specific scenarios are provided in the table on the survey form.



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## 6 Invasive species

Assess the abundance of invasive species in your survey area and note down the location of these in relation to any important habitat features identified in Section 3 and 4. This information will help to prioritise the management of invasives. You will find separate tables for invasive non-native and invasive native species. Once you have assessed the extent of each species you are then asked to make an overall estimate of the extent of invasive non-natives and native invasives across your survey area.

It is important to note that the severity of the threat to lichens and bryophytes isn't just determined by how extensive invasives are, but where invasives are located in relation to important features. In addition, an invasive species that is 'minor and isolated' may require more urgent action than one that is more widespread, as it is much easier to deal with invasives before they spread.

### Invasive non-native species



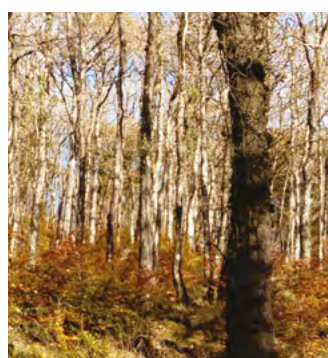
©April Windle

***Rhododendron ponticum*:**  
one of the most serious and widespread non-native invasive species threats.



©GBNNS

**Non-native conifer regeneration e.g. sitka and western hemlock:** specifically invading regeneration, rather than established mature trees.



**Beech regeneration\*:** can form dense stands and cast heavy shade around tree trunks and the ground layer.



**Sycamore regeneration\*:** can form dense stands and cast heavy shade around tree trunks and the ground layer.



©Su Cooper/Plantlife

***Cotoneaster* spp.**



©GBNNS

***Gaultheria shallon* (Shallon)**



***Gunnera tinctoria* (Giant rhubarb)**



©Neil Sanderson

***Lysichiton americanus* (American skunk-cabbage)**



©Andrew Gagg/Plantlife

***Prunus laurocerasus* (Cherry laurel)**



©Trevor Dines/Plantlife

***Impatiens glandulifera* (Himalayan balsam)**

\*Beech is included in the invasive non-native species section here as although native to parts of Britain, it is generally considered non-native in the temperate rainforest zone. Mature beech casts deep shade and beech regenerates readily in shaded conditions, further blocking out light for rainforest lichens and often suppressing native tree regeneration (e.g. oak).

Sycamore, although naturalised across Britain, is also considered non-native and can form dense areas of regeneration that have a similar shading impact. It is important to note that mature Sycamore can have an important role in some woodlands as a replacement for ash, given the threat of ash dieback. For more information on beech and sycamore see '[Managing the Rainforest: a toolkit for woodland managers](#)'

## Invasive native species

Holly and ivy are a valuable part of the temperate rainforest ecosystem. However, where their growth is dense and unconstrained by woodland grazing/browsing, they have the potential to cause similar problems to non-native invasives.

© GBNNSS



**Dense holly:** can develop dense thicket-like growth, blocking light from tree trunks and the ground layer.

© April Windle



**Dense, unconstrained ivy growth on trees:** although an important component of the ecosystem, dense ivy foliage covering a large proportion of tree trunks, particularly veteran trees, removes an important niche for lichens and bryophytes.

### Understanding your invasive species results:

You will have a score from 0 to -5 for both invasive non-native species and native invasives. The optimum score for this section is zero, because a lack of invasives does not add to the lichen and bryophyte interest of a site, but presence does detract from and threaten the interest. A lower score indicates that current condition is likely to be poorer. However, it is important to remember that minor and isolated issues need to be dealt as a matter of urgency, even if they aren't currently affecting conditions for lichens, bryophytes or other species, as without action they will spread. Links to specific guidance on dealing with invasive species can be found on the survey form.

## 7 Ash dieback

Ash is an important tree for lichens in particular, being noteworthy for the *Lobarion* lichen community in temperate rainforests. Use the tables on the survey form to assess the risk to lichens from ash dieback and the prevalence of ash dieback at your site. This will give you a risk level and a prevalence level. These can be multiplied to provide a threat score.

### Understanding the threat posed by ash dieback to lichens at your site and what this means for management:

The threat score will indicate how much of a threat ash dieback is currently posing to lichens at your site. The score indicates immediacy with which action should be taken. It is important to note that if you have a site dominated by ash, with most lichen interest on ash trees, but ash dieback is currently rare in your wood, it is still important to put mitigation in place to minimise losses. You will find a link to specific management guidance for ash dieback mitigation on the survey form. In planning mitigation, it will be useful to consider what alternative tree species at your site could support the existing lichen interest on ash. The DAFOR assessment made in Section 1 will help with this.

# Indicator species list by region

## Download the relevant lichen, bryopete and fern guides for your region.

The lists below highlight the species that are most indicative from those guides. Note that these lists do not contain all indicator species for the region, but focus on those that are easier to identify without specialist knowledge. Some scientific names for species have recently changed – in these cases the old name is given in brackets.

## Scotland

### Lichens of base-rich bark and rock (Lobarion community) – especially on ash, hazel, willow, elm and old oak.

Scientific name (delete as found in guides pre-2022)	Common name	Habitat feature associated with
<i>Gabura fascicularis</i> ( <i>Collema fascicularis</i> )	Cushion jelly' or 'Octopus suckers'	Base-rich bark and rock but particularly old, undisturbed hazel.
<i>Leptogium brebissonii</i>	'Blobby' jelly-skin lichen	On base-rich bark and mossy, base-rich rocks.
<i>Leptogium burgessii</i>	Frilly-fruited jelly-skin lichen	On base-rich bark and mossy, base-rich rocks.
<i>Lobaria pulmonaria</i>	Tree lungwort	On base-rich bark and rock.
<i>Lobarina scrobiculata</i> ( <i>Lobaria scrobiculata</i> )	Lob scrob	Mainly on old base-rich trees, occasionally rocks.
<i>Mycobilimbia sphaeroides</i> ( <i>Mycobilimbia pilularis</i> )		On base-rich bark at near bases mature trees, in humid places.
<i>Nephroma laevigatum</i>	A kidney lichen	On base-rich bark and rock.
<i>Nevesia sampaiana</i> ( <i>Fuscopannaria sampaiana</i> )	Brown-shingle lichen	Base-rich bark on old trees.
<i>Pannaria conoplea</i>	Mealy-rimmed shingle lichen	On mossy, base-rich trees.
<i>Pannaria rubiginosa</i>	Red-eyed shingle lichen	On mossy, base-rich trees and rocks.
<i>Pectenien atlantica</i> ( <i>Degelia atlantica</i> )	Felt lichen	Base-rich bark and occasionally rock.
<i>Pectenien plumbea s. str.</i> ( <i>Degelia plumbea s. lat.</i> )	Plum-fruited felt lichen	Base-rich bark and rock.
<i>Peltigera collina</i>	A dog lichen	On mossy, base-rich trees and rocks.
<i>Pseudocyphellaria citrina</i> ( <i>Pseudocyphellaria crocata</i> )	Yellow specklebelly	In sheltered woods on mossy, base-rich trees and rocks.
<i>Pseudocyphellaria norvegica</i>	Norweigan specklebelly	In sheltered woods on mossy, base-rich trees and rocks.
<i>Ricasolia amplissima</i> ( <i>Lobaria amplissima</i> )	Parchment lichen	Mainly on old base-rich trees, occasionally rocks.
<i>Ricasolia virens</i> ( <i>Lobaria virens</i> )	Green satin lichen	On base-rich bark and rock. More shade-tolerant than other <i>Lobaria</i> species.
<i>Sticta fuliginosa s. lat.</i>	A stinky Sticta	On mossy, base-rich trees and rocks.
<i>Sticta limbata</i>	Floury Sticta	On mossy, base-rich trees and rocks.
<i>Sticta sylvatica</i>	A stinky Sticta	On mossy, base-rich trees and rocks.

## Lichens of acidic bark – especially on oak, birch and alder – and rocks (*Parmelion* community)

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Bunodophoron melanocarpum</i>	Black-eyed Susan	On mossy, acidic rock.
<i>Ceterelia olivetorum</i> s. lat.	Speckled sea-storm lichen	On mossy acid-bark trees, rarely on rock.
<i>Hypotrachyna laevigata</i>	Smooth loop lichen	On mossy acid-bark trees and acid rocks.
<i>Hypotrachyna sinuosa</i>	Green loop lichen	On well-lit acid-bark trees and rocks e.g. woodland edges, wood pasture.
<i>Hypotrachyna taylorensis</i>	Tailed loop lichen	On mossy acid-bark trees and acid rocks.
<i>Menegazzia terebrata</i>	Tree flute	On shaded acid bark, including heather stems, and acidic rocks.
<i>Mycoblastus sanguinarius</i>	Bloody-heart lichen	On acid bark and rock, also on lignum.
<i>Ochrolechia tartarea</i>	A cudbear lichen	On acid bark and rock.
<i>Sphaerophorus globosus</i>	A coral lichen	On mossy acid-bark trees and rock. Also directly on peaty soils.

## Bryophytes

Scientific name	Common name	Habitat feature associated with
<i>Jubula hutchinsiae</i>	Hutchins' hollywort	Ravines, vertical rock faces and boulders in splash zone.
<i>Lepidozia cupressina</i>	Rock fingerwort	Rocks, tree bases and decaying wood, often near ravines.
<i>Plagiochila punctata</i>	Spotted featherwort	Trees and rock faces, usually close to watercourses.
<i>Plagiochila spinulosa</i>	Prickly featherwort	Trees and rock faces, usually close to watercourses.
<i>Pseudomarsupidium decipiens</i> ( <i>Adelanthus decipiens</i> )	Deceptive featherwort	Dry rock faces in humid woods. Occasionally on tree bases or dead wood.
<i>Scapania gracilis</i>	Western earwort	Humid rock faces and tree trunks.

## Ferns

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Dryopteris aemula</i>	Hay-scented buckler fern	Generally lowland and coastal temperate rainforest sites. On well-drained acid to neutral soils.
<i>Gymnocarpium dryopteris</i>	Oak fern	In well-lit, rocky woods and upland areas. Often along watercourses and ravines.
<i>Hymenophyllum wilsonii</i>	Wilson's filmy fern	In very humid places on tree bases, rocks and throughout humid river valleys.
<i>Phaeopteris connectilis</i>	Beech fern	On soils, boulders and wet rock faces.

# Wales

## Lichens of base-rich bark and rock (*Lobarion* community) – especially on ash, hazel, willow, elm and old oak.

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Fuscopannaria sampaiana</i> ( <i>Nevesia sampaiana</i> )	Brown-shingle lichen	Base-rich bark on old trees.
<i>Leptogium brebissonii</i>	‘Blobby’ jelly-skin lichen	On base-rich bark and mossy, base-rich rocks. Rare in Wales (see Scotland guide to Lobarion community).
<i>Leptogium burgessii</i>	Frilly-fruited jelly-skin lichen	On base-rich bark and mossy, base-rich rocks (see Scotland guide to Lobarion community).
<i>Leptogium cyanescens</i>	Blue jelly-skin lichen	On mossy, base-rich trees and rocks, usually near watercourses.
<i>Lobaria pulmonaria</i>	Tree lungwort	On base-rich bark and rock.
<i>Lobarina scrobiculata</i> ( <i>Lobaria scrobiculata</i> )	Lob scrob	Mainly on old base-rich trees, occasionally rocks.
<i>Mycobilimbia sphaeroides</i> ( <i>Mycobilimbia pilularis</i> )		On base-rich bark at near bases mature trees, in humid places.
<i>Nephroma laevigatum</i>	A kidney lichen	On base-rich bark and rock.
<i>Nephroma parile</i>	Powdery kidney lichen	On base-rich bark and rock.
<i>Pannaria conoplea</i>	Mealy-rimmed shingle lichen	On mossy, base-rich trees.
<i>Pannaria rubiginosa</i>	Red-eyed shingle lichen	On mossy, base-rich trees and rocks (see Scotland guide to Lobarion community).
<i>Parmeliella triptophylla</i>	Black-bordered shingle lichen	On shaded, mossy base-rich trees and rocks
<i>Pectenaria atlantica</i> ( <i>Degelia atlantica</i> )	Felt lichen	Base-rich bark and occasionally rock.
<i>Pectenaria plumbea</i> s. str. ( <i>Degelia plumbea</i> s. lat.)	Plum-fruited felt lichen	Base-rich bark and rock (see Scotland guide to Lobarion community).
<i>Peltigera collina</i>	Floury dog lichen	On mossy, base-rich trees and rocks.
<i>Peltigera horizontalis</i>	A dog lichen	On mossy, base-rich trees and rocks.
<i>Pseudocyphellaria norvegica</i>	Norweigan specklebelly	In sheltered woods on mossy, base-rich trees and rocks. Rare in Wales (see Scotland guide to Lobarion community).
<i>Ricasolia amplissima</i> ( <i>Lobaria amplissima</i> )	Parchment lichen	Mainly on old base-rich trees, occasionally rocks.
<i>Ricasolia virens</i> ( <i>Lobaria virens</i> )	Green satin lichen	On base-rich bark and rock. More shade-tolerant than other <i>Lobaria</i> species.
<i>Scytinium lichenoides</i> ( <i>Leptogium lichenoides</i> )	Tattered jelly-skin lichen	On mossy, base-rich trees and rocks.
<i>Sticta fuliginosa</i> s. lat.	A stinky Sticta	On mossy, base-rich trees and rocks.
<i>Sticta limbata</i>	Floury Sticta	On mossy, base-rich trees and rocks.
<i>Sticta sylvatica</i>	A stinky Sticta	On mossy, base-rich trees and rocks.

## Lichens of acidic bark – especially on oak, birch and alder – and rocks (*Parmelion* community)

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Bryoria fuscescens</i>	Horsehair lichen	On acid bark trees and rock – very sensitive to air pollution.
<i>Bunodophoron melanocarpum</i>	Black-eyed Susan	On mossy, acidic rock.
<i>Ceterelia olivetorum</i> s. lat.	Speckled sea-storm lichen	On mossy acid-bark trees, rarely on rock.
<i>Hypotrachyna laevigata</i>	Smooth loop lichen	On mossy acid-bark trees and acid rocks.
<i>Hypotrachyna sinuosa</i>	Green loop lichen	On well-lit acid-bark trees and rocks e.g. woodland edges, wood pasture. (See Scotland guide to <i>Parmelion</i> community).
<i>Hypotrachyna taylorensis</i>	Tailed loop lichen	On mossy acid-bark trees and acid rocks.
<i>Menegazzia terebrata</i>	Tree flute	On shaded acid bark, including heather stems, and acidic rocks.
<i>Mycoblastus sanguinarius</i>	Bloody-heart lichen	On acid bark and rock, also on lignum.
<i>Ochrolechia tartarea</i>	A cudbear lichen	On acid bark and rock.
<i>Parmelinopsis horrescens</i>	Hairy-spined shield lichen	On acid to neutral bark.
<i>Parmelinopsis minarum</i>	New Forest Parmelia	On sheltered, well-lit acid rock and trees. Rare in Wales (see south-west <i>Parmelion</i> guide).
<i>Parmotrema crinitum</i>	Desperate Dan	On well-lit, mossy, acid-bark trees and rock.
<i>Sphaerophorus globosus</i>	A coral lichen	On acidic, mossy bark and rock. Also directly on peaty soils.

## Bryophytes

Scientific name	Common name	Habitat feature associated with
<i>Jubula hutchinsiae</i>	Hutchins' hollywort	Ravines, vertical rock faces and boulders in splash zone.
<i>Lepidozia cupressina</i>	Rock fingerwort	Rocks, tree bases and decaying wood, often near ravines (see Scotland guide).
<i>Plagiochila punctata</i>	Spotted featherwort	Trees and rock faces, usually close to watercourses.
<i>Plagiochila spinulosa</i>	Prickly featherwort	Trees and rock faces, usually close to watercourses.
<i>Pseudomarsupidium decipiens</i> ( <i>Adelanthus decipiens</i> )	Deceptive featherwort	Dry rock faces in humid woods. Occasionally on tree bases or dead wood.
<i>Scapania gracilis</i>	Western earwort	Humid rock faces and tree trunks.

## Ferns

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Dryopteris aemula</i>	Hay-scented buckler fern	Generally lowland and coastal temperate rainforest sites. On well-drained acid to neutral soils.
<i>Gymnocarpium dryopteris</i>	Oak fern	In well-lit, rocky woods and upland areas. Often along watercourses and ravines.
<i>Hymenophyllum wilsonii</i>	Wilson's filmy fern	In very humid places on tree bases, rocks and throughout humid river valleys.
<i>Phaegopteris connectilis</i>	Beech fern	On soils, boulders and wet rock faces.

## South-west England

### Lichens of base-rich bark and rock (*Lobarion* community) – especially on ash, hazel, willow, elm and old oak.

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Leptogium cyanescens</i>	Blue jelly-skin lichen	On mossy, base-rich trees and rocks, usually near watercourses.
<i>Lobaria pulmonaria</i>	Tree lungwort	On base-rich bark and rock.
<i>Lobarina scrobiculata</i> ( <i>Lobaria scrobiculata</i> )	Lob scrob	Mainly on old base-rich trees, occasionally rocks.
<i>Mycobilimbia sphaeroides</i> ( <i>Mycobilimbia pilularis</i> )		On base-rich bark at near bases mature trees, in humid places.
<i>Nephroma laevigatum</i>	A kidney lichen	On base-rich bark and rock.
<i>Nephroma parile</i>	Powdery kidney lichen	On base-rich bark and rock.
<i>Nevesia sampaiana</i> ( <i>Fuscopannaria sampaiana</i> )	Brown-shingle lichen	Base-rich bark on old trees. Very rare in SW (see Scotland/Wales guides to Lobarion community).
<i>Pannaria conoplea</i>	Mealy-rimmed shingle lichen	On mossy, base-rich trees.
<i>Pannaria rubiginosa</i>	Red-eyed shingle lichen	On mossy, base-rich trees and rocks (see Scotland guide to Lobarion community).
<i>Parmeliella triptophylla</i>	Black-bordered shingle lichen	On shaded, mossy base-rich trees and rocks
<i>Pectenien atlantica</i> ( <i>Degelia atlantica</i> )	Felt lichen	Base-rich bark and occasionally rock.
<i>Pectenien plumbea</i> s. str. ( <i>Degelia plumbea</i> s. lat.)	Plum-fruited felt lichen	Base-rich bark and rock (see Scotland guide to Lobarion community).
<i>Peltigera collina</i>	Floury dog lichen	On mossy, base-rich trees and rocks.
<i>Peltigera horizontalis</i>	A dog lichen	On mossy, base-rich trees and rocks.
<i>Pseudocyphellaria crocata</i>	Yellow specklebelly	In sheltered woods on mossy, base-rich trees and rocks. Rare in SW (see Scotland guide to Lobarion community).
<i>Ricasolia amplissima</i> ( <i>Lobaria amplissima</i> )	Parchment lichen	Mainly on old base-rich trees, occasionally rocks.
<i>Ricasolia virens</i> ( <i>Lobaria virens</i> )	Green satin lichen	On base-rich bark and rock. More shade-tolerant than other <i>Lobaria</i> species.
<i>Scytinium lichenoides</i> ( <i>Leptogium lichenoides</i> )	Tattered jelly-skin lichen	On mossy, base-rich trees and rocks.
<i>Sticta fuliginosa</i> s. lat.	A stinky Sticta	On mossy, base-rich trees and rocks.
<i>Sticta limbata</i>	Floury Sticta	On mossy, base-rich trees and rocks.
<i>Sticta sylvatica</i>	A stinky Sticta	On mossy, base-rich trees and rocks.

### Lichens of acidic bark – especially on oak, birch and alder – and rocks (*Parmelion* community)

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Bryoria fuscescens</i>	Horsehair lichen	On acid bark trees and rock - very sensitive to air pollution (see Wales guide).
<i>Bunodophoron melanocarpum</i>	Black-eyed Susan	On mossy, acidic rock.

<i>Ceterelia olivetorum s. lat.</i>	Speckled sea-storm lichen	On mossy acid-bark trees, rarely on rock.
<i>Hypotrachyna laevigata</i>	Smooth loop lichen	On mossy acid-bark trees and acid rocks.
<i>Hypotrachyna sinuosa</i>	Green loop lichen	On well-lit acid-bark trees and rocks e.g. woodland edges, wood pasture. (See Scotland guide to <i>Parmelion</i> community).
<i>Hypotrachyna taylorensis</i>	Tailed loop lichen	On mossy acid-bark trees and acid rocks.
<i>Menegazzia terebrata</i>	Tree flute	On shaded acid bark, including heather stems, and acidic rocks.
<i>Mycoblastus sanguinarius</i>	Bloody-heart lichen	On acid bark and rock, also on lignum (see Scotland guide to <i>Parmelion</i> community).
<i>Ochrolechia tartarea</i>	A cudbear lichen	On acid bark and rock.
<i>Parmelinopsis horrescens</i>	Hairy-spined shield lichen	On acid to neutral bark (see Wales guide to <i>Parmelion</i> community).
<i>Parmelinopsis minarum</i>	New Forest Parmelia	On sheltered, well-lit acid rock and trees in coastal sites.
<i>Parmotrema crinitum</i>	Desperate Dan	On well-lit, mossy, acid-bark trees and rock.
<i>Sphaerophorus globosus</i>	A coral lichen	On acidic, mossy bark and rock. Also directly on peaty soils.

## Bryophytes

Scientific name	Common name	Habitat feature associated with
<i>Jubula hutchinsiae</i>	Hutchins' hollywort	Ravines, vertical rock faces and boulders in splash zone.
<i>Lepidozia cupressina</i>	Rock fingerwort	Rocks, tree bases and decaying wood, often near ravines (see Scotland guide).
<i>Plagiochila punctata</i>	Spotted featherwort	Trees and rock faces, usually close to watercourses.
<i>Plagiochila spinulosa</i>	Prickly featherwort	Trees and rock faces, usually close to watercourses.
<i>Pseudomarsupidium decipiens</i> ( <i>Adelanthus decipiens</i> )	Deceptive featherwort	Dry rock faces in humid woods. Occasionally on tree bases or dead wood. Rare in SW (see Scotland bryophyte guide).
<i>Scapania gracilis</i>	Western earwort	Humid rock faces and tree trunks.

## Ferns

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Dryopteris aemula</i>	Hay-scented buckler fern	Generally lowland and coastal temperate rain-forest sites. On well-drained acid to neutral soils.
<i>Gymnocarpium dryopteris</i>	Oak fern	In well-lit, rocky woods and upland areas. Often along watercourses and ravines. Uncommon in south-west England.
<i>Hymenophyllum wilsonii</i>	Wilson's filmy fern	In very humid places on tree bases, rocks and throughout humid river valleys.
<i>Phaegopteris connectilis</i>	Beech fern	On soils, boulders and wet rock faces.

## Lake District

### Lichens of base-rich bark and rock (*Lobarion* community) – especially on ash, hazel, willow, elm and old oak.

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Leptogium burgessii</i>	Frilly-fruited jelly-skin lichen	On base-rich bark and mossy, base-rich rocks (see Scotland guide to Lobarion community).
<i>Leptogium cyanescens</i>	Blue jelly-skin lichen	On mossy, base-rich trees and rocks, usually near watercourses.
<i>Lobaria pulmonaria</i>	Tree lungwort	On base-rich bark and rock.
<i>Lobarina scrobiculata</i> ( <i>Lobaria scrobiculata</i> )	Lob scrob	Mainly on old base-rich trees, occasionally rocks.
<i>Mycobilimbia sphaeroides</i> ( <i>Mycobilimbia pilularis</i> )		On base-rich bark at near bases mature trees, in humid places.
<i>Nephroma laevigatum</i>	A kidney lichen	On base-rich bark and rock.
<i>Nephroma parile</i>	Powdery kidney lichen	On base-rich bark and rock.
<i>Pannaria conoplea</i>	Mealy-rimmed shingle lichen	On mossy, base-rich trees.
<i>Parmeliella triptophylla</i>	Black-bordered shingle lichen	On shaded, mossy base-rich trees and rocks
<i>Pectenaria atlantica</i> ( <i>Degelia atlantica</i> )	Felt lichen	Base-rich bark and occasionally rock.
<i>Pectenaria plumbea</i> s. str. ( <i>Degelia plumbea</i> s. lat.)	Plum-fruited felt lichen	Base-rich bark and rock (see Scotland guide to Lobarion community).
<i>Peltigera collina</i>	Floury dog lichen	On mossy, base-rich trees and rocks.
<i>Peltigera horizontalis</i>	A dog lichen	On mossy, base-rich trees and rocks.
<i>Ricasolia amplissima</i> ( <i>Lobaria amplissima</i> )	Parchment lichen	Mainly on old base-rich trees, occasionally rocks.
<i>Ricasolia virens</i> ( <i>Lobaria virens</i> )	Green satin lichen	On base-rich bark and rock. More shade-tolerant than other <i>Lobaria</i> species.
<i>Scytinium lichenoides</i> ( <i>Leptogium lichenoides</i> )	Tattered jelly-skin lichen	On mossy, base-rich trees and rocks.
<i>Sticta fuliginosa</i> s. lat.	A stinky Sticta	On mossy, base-rich trees and rocks.
<i>Sticta limbata</i>	Floury Sticta	On mossy, base-rich trees and rocks.
<i>Sticta sylvatica</i>	A stinky Sticta	On mossy, base-rich trees and rocks.

### Lichens of acidic bark – especially on oak, birch and alder – and rocks (*Parmelion* community)

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Bryoria fuscescens</i>	Horsehair lichen	On acid bark trees and rock - very sensitive to air pollution.
<i>Bunodophoron melanocarpum</i>	Black-eyed Susan	On mossy, acidic rock.
<i>Ceterelia olivetorum</i> s. lat.	Speckled sea-storm lichen	On mossy acid-bark trees, rarely on rock.
<i>Hypotrachyna laevigata</i>	Smooth loop lichen	On mossy acid-bark trees and acid rocks.

<i>Hypotrachyna sinuosa</i>	Green loop lichen	On well-lit acid-bark trees and rocks e.g. woodland edges, wood pasture. Rare in Lake District (see Scotland guide to <i>Parmelion</i> community).
<i>Hypotrachyna taylorensis</i>	Tailed loop lichen	On mossy acid-bark trees and acid rocks.
<i>Menegazzia terebrata</i>	Tree flute	On shaded acid bark, including heather stems, and acidic rocks.
<i>Mycoblastus sanguinarius</i>	Bloody-heart lichen	On acid bark and rock, also on lignum.
<i>Ochrolechia tartarea</i>	A cudbear lichen	On acid bark and rock.
<i>Parmotrema crinitum</i>	Desperate Dan	On well-lit, mossy, acid-bark trees and rock.
<i>Sphaerophorus globosus</i>	A coral lichen	On acidic, mossy bark and rock. Also directly on peaty soils.

## Bryophytes

Scientific name	Common name	Habitat feature associated with
<i>Jubula hutchinsiae</i>	Hutchins' hollywort	Ravines, vertical rock faces and boulders in splash zone.
<i>Lepidozia cupressina</i>	Rock fingerwort	Rocks, tree bases and decaying wood, often near ravines (see Scotland guide).
<i>Plagiochila punctata</i>	Spotted featherwort	Trees and rock faces, usually close to watercourses.
<i>Plagiochila spinulosa</i>	Prickly featherwort	Trees and rock faces, usually close to watercourses.
<i>Pseudomarsupidium decipiens</i> ( <i>Adelanthus decipiens</i> )	Deceptive featherwort	Dry rock faces in humid woods. Occasionally on tree bases or dead wood (see Scotland/Wales bryophyte guides).
<i>Scapania gracilis</i>	Western earwort	Humid rock faces and tree trunks.

## Ferns

Scientific name as found in guides pre-2022	Common name	Habitat feature associated with
<i>Dryopteris aemula</i>	Hay-scented buckler fern	Generally lowland and coastal temperate rain-forest sites. On well-drained acid to neutral soils.
<i>Gymnocarpium dryopteris</i>	Oak fern	In well-lit, rocky woods and upland areas. Often along watercourses and ravines.
<i>Hymenophyllum wilsonii</i>	Wilson's filmy fern	In very humid places on tree bases, rocks and throughout humid river valleys.
<i>Phaegopteris connectilis</i>	Beech fern	On soils, boulders and wet rock faces.



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**To secure a world rich in  
wild plants and fungi.**

