

2 DOES THE LICHEN HAVE TINY LEAFY LOBES? (continued)

Degelia atlantica Felt lichen



Pannaria conoplea Mealy-rimmed shingle lichen



Thelotrema lepadinum Barnacle lichen



Mycobilimbia pilularis



Form Scallop-like plates closely attached to the substrate with longitudinal ridges, concentric 'growth' rings and blackish felted margins (the hypothallus).
Colour Pale grey, sometimes tinged brown; darker when wet.
Soredia/Isidia Numerous knobby isidia on the surface and margins, especially on the raised ridges where the lobe margins meet.
Fruit Very rare; reddish.
Underside Thick blackish or greyish velvety mat (hypothallus) visible at the edges of upturned lobe margins.
Notes Similar to *D. plumbea*, but this is usually abundantly fertile and lacks isidia, and *Pannaria conoplea*, but this is finer and more leafy, lacking the solid look of *D. atlantica*.

Form Small lobes with finely scalloped margins.
Colour Pale grey to blue-grey with paler margins, sometimes tinged brown and darker when wet.
Soredia/Isidia Coarse grey soredia on the lobe margins.
Fruit Very rare.
Underside Blackish or greyish velvety mat (hypothallus) not usually visible.
Notes Similar to *P. rubiginosa*, but this is usually abundantly fertile and has no soredia.

Form A thin crust with numerous small, distinctive barnacle-like fruits.
Colour Whitish to pale grey.
Soredia/Isidia None.
Fruit Abundant; like small barnacles.
Notes Typically found on smooth bark of hazel and rowan, and mature ash and oak.

Form A fine granular dusting with distinctive fruits.
Colour Green to grey-green, greener when wet.
Soredia/Isidia None.
Fruit Abundant; buff to pinkish orange and globular, or pill-like.
Notes Frequently found on or near the base of mature trees, often in more shaded conditions.

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3 IS THE LICHEN CRUSTY AND GRANULAR? (continued)

Leptogium lichenoides Tattered jelly-skin lichen



Leptogium cyanescens Blue jelly-skin lichen



Parmeliella triptophylla Black-bordered shingle lichen



Form Tiny lobules on a wide black margin (hypothallus), often with a dense crust of isidia in the centre.
Colour Blackish when wet to brown or grey-brown when dry.
Soredia/Isidia Minute, thin and finger-like isidia, often branched (best visible when dry).
Fruit Rare; small (to 1mm), red-brown.
Underside Black hypothallus extending beyond the margins of the lobes.
Notes Appears as a dark stain on the bark of trees (especially old ash).

3 IS THE LICHEN CRUSTY OR GRANULAR?

Dimerella lutea Orange dimple lichen



Form A thin crust, sometimes barely visible, or finely granular.
Colour Pale grey-green to grey.
Soredia/Isidia None.
Fruit Small (to 2mm), orange with a pale margin, looking like minute apricot halves (especially when wet). Produced seasonally.
Notes Mainly grows on mosses or bark in damp shaded situations. There are only two British species of *Dimerella*; the other has smaller white to pinkish fruits and rarely occurs on mosses.

Form Dense mass of very thin lobes that appear minutely frilly at the margins due to abundant isidia.
Colour Dark brown when wet, grey to grey-brown when dry.
Soredia/Isidia Abundant elongated cylindrical isidia on lobe margins.
Fruit Rare; small red-brown disc.
Underside Ridged.
Notes Found among mosses on trees (especially ash) and sometimes on mossy rocks in old woodlands. Very similar to some other *Leptogium* species – for example, *L. pulvinatum* (but that species has flattened isidia).

Form Intricate rosettes of thin overlapping lobes with isidia or lobules, or both.
Colour Pale blue-grey when dry, dark grey to blackish when wet.
Soredia/Isidia Cylindrical or flattened isidia or lobules abundant on lobe margins and/or surface.
Fruit Very rare.
Underside Smooth or slightly wrinkled.
Notes When wet, it is similar to some other *Leptogium* species. If in doubt, dry a specimen to see the distinctive colour of dry *L. cyanescens*.

Some key features to look for when identifying lichens

Use a hand lens (preferably x10 magnification) to examine them.

Colour Of upper (and if visible, the lower) surface. The colour of a species can vary – for example, depending on whether it is wet or dry.

Cyphellae and **pseudocyphellae** Pores or cracks that expose the interior of the lichen, appearing as paler spots or lines on the surface.

Fruits Reproductive structures that produce spores. They can be round discs, pimple-like or globular, and their colour often contrasts with the lichen surface.

Hypothallus A dark mat on the lower surface, often only visible between lobes or at the margins. It may be thin and visible only as a dark stain, but when well developed may be thicker and velvet-like.

Isidia Tiny projections on the surface that may be nodular, granular, finger-like, or branched like tiny fragments of coral. They are a means of vegetative reproduction.

Lobe The rounded 'leaf' of a leafy lichen.

Lobules Small 'secondary' lobes that develop on the margins or on the surface of lobes.

Rhizines Root-like structures, as found on the underside of *Peltigera* species. These may be straight, forked or branched.

Soredia Floury powder or coarse granules that often occur along ridges or cracks on the surface, or on the lobe margins. They may be diffuse or arise in discrete structures (termed **soralia**). Like isidia, they are a means of vegetative reproduction.

Tomentum An even or patchy carpet of short hairs (usually brownish or pale) on the underside as found in *Sticta* species.

Fruits and isidia on *Lobaria pulmonaria*



Lobules on *Leptogium cyanescens*



Soredia on *Sticta limbata*



Hypothallus on *Degelia* sp.



Rhizines on *Peltigera* sp.



Tomentum with cyphellae on *Sticta* sp.



Lichens of temperate rainforest in the Lake District

Guide 1 The *Lobarion* lichens of ash, hazel, willow, rowan and old oak



This guide is for anyone interested in identifying some of the more conspicuous lichens of temperate rainforest in the Lake District. Different species of lichen often grow together, forming distinct communities. The *Lobarion* community grows on trees with mildly acidic or alkaline bark – for example, ash, sycamore, willow, rowan and old oak – and is characterised by large leafy lichens, especially the four *Lobaria* species.

A companion guide (Guide 2) looks at the *Parmelion* community of lichens. These grow on trees with very acidic bark.

What is a lichen?

A lichen is a special association between a fungus and an alga. The fungus forms the main body of the lichen, providing an upper surface that protects the alga underneath, while the alga manufactures food using the energy of sunlight (photosynthesis). Each lichen has its own distinct species of fungus, but all lichens share just a small number of algae species; in most cases this is a green alga.

What is temperate rainforest?

Temperate rainforest is a type of usually ancient natural or semi-natural, broad-leaved woodland 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 lichens. Temperate rainforest has been compared to tropical rainforest because of their luxuriant growth of lichens, ferns, mosses and liverworts.

Why are the Lake District's temperate rainforests important for lichens?

The temperate rainforests of western Britain are an important habitat for many lichens, mosses and liverworts. Many of these are largely confined to areas with low air pollution and ancient or long-established woodlands, for example those that have never been clear-felled or intensively coppiced. They play a fundamental role in woodland ecosystems, and are indicators of habitats that are of high quality and have been that way for a long period of time.

Many of these lichens are not found in other parts of Britain and Europe, and some are globally rare. A number of species are considered of "principal importance for the conservation of biodiversity in England" under Section 41 of the Natural Environment and Rural Communities Act (2006). Further details of species conservation status can be found in the GB Red List (see the books section under 'Further information').

Finding and identifying lichens

The best areas will often be slopes and river valleys with mixed deciduous woods containing hazel and old trees of ash, rowan, willow and oak. *Lobarion* species occur on bark, or on mats of mosses and liverworts growing over bark. Many species also grow on mossy boulders and rocks, especially in humid situations. The large, leafy lobes of *Peltigera horizontalis* and the black smears of *Parmeliella triptophylla* are good indicators of interesting habitat.

To identify a lichen, first look at its growth form:

- Does it consist of leafy lobes? If so, see Section 1 of this guide.
- Does it consist of small or tiny leafy lobes that look like roof-shingles? If so, see Section 2 of this guide.
- Is it crusty or powdery? If so, see Section 3 of this guide.
- Is it jelly-like when wet? If so, see Section 4 of this guide.

The key features to look for when identifying lichens are described on the back page. To see these features well, and to fully appreciate the beauty of lichens, you will need to use a magnifier or a hand lens of x10-15 magnification.

Although internationally important for their rich lichen and bryophyte communities, temperate rainforests face a number of threats. Therefore, Plantlife is securing their future by working with landowners and managers, helping to develop their skills in identifying important sites and species; raising awareness of the key conservation issues; identifying priority areas for management; and planning effective habitat management that will build more secure and resilient populations.

Please submit any records you make to the British Lichen Society (see below). Records should comprise of date observed, site name, grid reference, names of surveyors, species and abundance. Please note that scientific names should always be used when recording.

Further information

Books

Lichens: An Illustrated Guide to the British and Irish Species, Frank Dobson, 7th Edition (2018), Richmond Publishing Co Ltd.
Lichens, Oliver Gilbert (2000), Collins New Naturalist series, HarperCollins.
A Conservation Evaluation of British Lichens and Lichenicolous Fungi, Woods & Coppins (2012), JNCC.

<http://jncc.defra.gov.uk/page-6197>

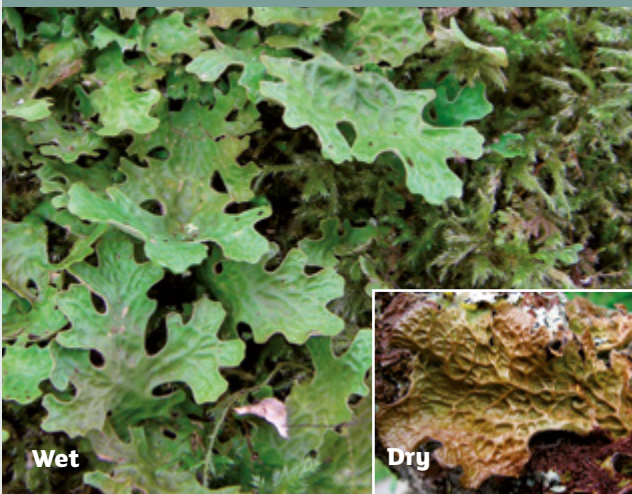
This is the current Red List for lichens in Great Britain.

Websites

www.britishtichensociety.org.uk The British Lichen Society (BLS) website provides a wide range of information about all aspects of lichens and lichenology.
nbnatlas.org The NBN atlas hosts an up-to-date database of British lichen distribution.
www.uklichens.co.uk The UK lichens website has useful photos of many UK species.
www.wales-lichens.org.uk This website is dedicated to the conservation of lichens in Wales, but is a great resource for some of the Lake District's temperate rainforest species.

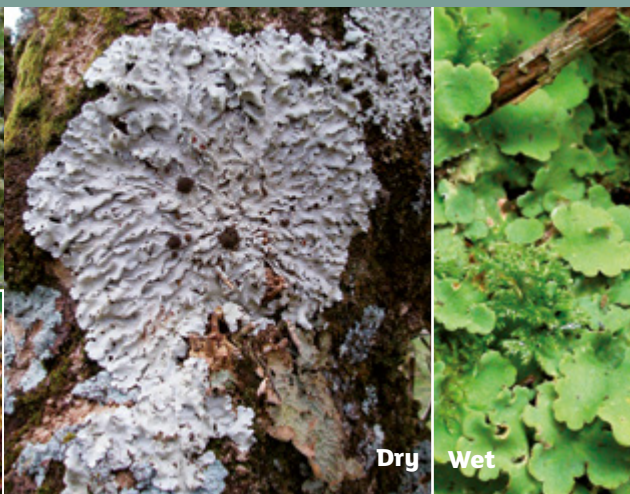
1 DOES THE LICHEN HAVE WELL-DEVELOPED LEAFY LOBES?

Lobaria pulmonaria Tree lungwort



Form Loosely attached lobes with a distinctive network of ridges giving a lung-like appearance.
Colour Green when wet, brownish green when dry.
Soredia/Isidia Often has small peg-like isidia and soredia on the margins and ridges.
Fruit Rare; a red-brown disc.
Underside A patchy tomentum with convex naked areas corresponding to depressions between the ridges on the upper surface.
Notes Protected from collection for selling under Schedule 8 of the Wildlife and Countryside Act (1981).

Lobaria amplissima Parchment lichen



Form Closely pressed to the substrate, smooth or wrinkled lobes with wavy margins; usually with dark brown rounded, shrubby growths (known as cephalodia) on the surface. Margins of young lobes have a fine frosting when dry.
Colour Pale grey (when dry) to pale green-grey (when wet), often with brown tips.
Soredia/Isidia None.
Fruit Scarce; a red-brown disc with a white margin.
Underside An even tomentum.
Notes Similar to *L. virens* when wet/green but that species never has cephalodia. *Flavoparmelia caperata* is brighter yellow-green, but has soralia and never has cephalodia.

Nephroma laevigatum Kidney lichen



Form Thin, papery lobes with distinctive fruits on the underside of upturned lobe tips. Often has tiny flattened lobules on lobe margins.
Colour Brown-grey to brown when wet, often red-brown when dry.
Soredia/Isidia None.
Fruit Frequent; an orange-brown disc on the underside of the upturned lobe tip.
Underside Smooth or wrinkled.
Notes Can appear similar in some ways to *Peltigera horizontalis* but it is a much more delicate lichen with a thinner thallus, and the fruits are held on the underside of the lobe tips. The photo above is taken from below.

Nephroma parile Powdery kidney lichen



Form Leafy lobes.
Colour Chocolate-brown to reddish brown.
Soredia/Isidia Grey to brownish granular soredia along the margins and occasionally on the lobes.
Fruit Very rare.
Underside Pale and usually smooth, lacking other features – for example, rhizines or cyphellae.
Notes Similar to *Peltigera collina* but that species has rhizines, and to *Sticta limbata* but that species has cyphellae.

Sticta fuliginosa s.lat A stinky Sticta



Form Rounded lobes with downturned margins; lobes undivided but may be notched or irregular.
Colour Blackish brown when wet, dark grey-brown when dry.
Soredia/Isidia Tiny coral-like isidia visible as dark granular patches on the surface of the lobes.
Fruit Scarce; red-brown, often with pale hairs on margins.
Underside Pale or brown tomentum with paler spots (cyphellae).
Notes Smells fishy when wet (rub with a finger and smell). Similar to *S. sylvatica*. This has recently been split into a number of different species, and should be recorded as *Sticta fuliginosa s.lat*.

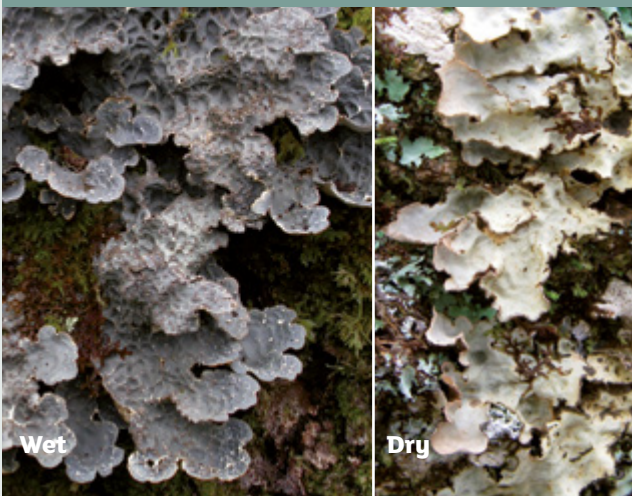
Sticta sylvatica A stinky Sticta



Form Irregularly branched lobes.
Colour Grey or brown to blackish brown when wet, dark grey to grey-brown when dry.
Soredia/Isidia Tiny coral-like isidia visible as dark granular patches on the surface of the lobes.
Fruit Not recorded in the UK.
Underside Pale or brown tomentum with paler spots (cyphellae).
Notes Smells fishy when wet (rub with a finger and smell). When poorly developed, it is difficult to distinguish from some irregularly notched forms of *S. fuliginosa*.

2 DOES THE LICHEN HAVE TINY LEAFY LOBES?

Lobaria scrobiculata Lob scrob



Form Loosely attached irregular lobes with ridges.
Colour Yellowish grey (dry) or blue-grey (wet).
Soredia/Isidia Grey to blue-grey soredia; spreading along the ridges and lobe margins.
Fruit Rare; a red-brown disc with a thick green margin.
Underside A patchy tomentum with convex naked areas corresponding to depressions between the ridges on the upper surface.

Lobaria virens Green satin lichen



Form Smooth or wrinkled wavy lobes closely pressed to the substrate.
Colour Green when wet, brownish green when dry.
Soredia/Isidia None.
Fruit Frequent; an orange disc with a thick green margin.
Underside An even tomentum.
Notes Similar to *L. amplissima* (see above) and *Flavoparmelia caperata*, which is much commoner, a paler apple green colour and only rarely fertile.

Peltigera horizontalis Dog lichen



Form Large smooth lobes forming large patches.
Colour Brown to grey-brown when wet, grey when dry.
Soredia/Isidia None.
Fruit Frequent; chestnut-brown, rounded, held parallel to the lobe surface – i.e. horizontally.
Underside White with a network of dark veins and brown rhizines that look like twisted ends of frayed rope.
Notes Similar to other *Peltigera* species but the rounded fruits and underside are distinctive.

Peltigera collina Flourey dog-lichen



Form Lobes with raised wavy/frilly margins and soredia.
Colour Grey, blue-grey to grey-brown when dry, grey when wet.
Soredia/Isidia Coarse, pale-grey to blue-grey soredia on the wavy lobe margins.
Fruit Rare; dark brown to blackish.
Underside Soft rhizines.
Notes This is the only *Peltigera* species with marginal soralia. It is similar to *Nephroma parile*, which has a smooth or wrinkled underside with no rhizines).

Sticta limbata Flourey Sticta



Form Rounded, sometimes notched or irregular lobes with downturned floury margins.
Colour Pale grey to pale grey-brown, darker when wet.
Soredia/Isidia Diffuse, floury, pale-grey soredia along margins and spreading on to surface.
Fruit Very rare.
Underside Pale or brown tomentum with paler spots (cyphellae).
Notes When poorly developed, could be confused with *Nephroma parile*, which has a smooth underside with no pale spots.

Normandina pulchella Elf ears



Form Tiny rounded ear-like lobes with a distinctive pale rim.
Colour Pale blue-grey to pale green-grey; greener when wet.
Soredia/Isidia Greyish to greenish soredia, mainly on the margins and sometimes spreading to cover lobes.
Fruit Only very rarely recorded in the UK.
Notes May be scattered or clustered; usually grows on mosses, liverworts or other lichens.