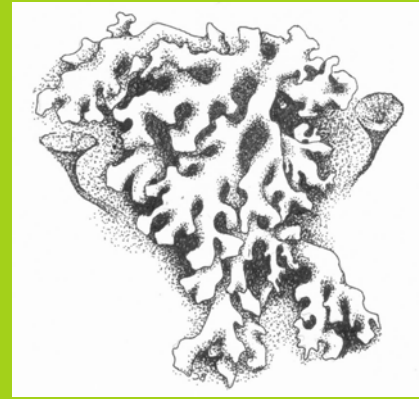


Lichens Generic Action Plan

STATUS

The Wildlife and Countryside Act 1981 (as amended) protects 17 species of lichen. However, none of these are currently found in the Durham area.

Lichens are threatened by atmospheric pollution, inappropriate habitat management and a clean, tidy approach to building maintenance.



WHAT ARE LICHENS ?

Lichens are actually two organisms in one. They are formed by a partnership between a fungus (which provides the lichen body) and an alga (or sometimes a cyanobacterium) which provides nutrition by means of photosynthesis. The relationship of the two partners is self supporting and mutually beneficial. This is a type of symbiosis referred to as mutualism. The relationship of the two partners enables lichens to grow in places where neither fungi or algae could grow alone. To produce a lichen, fungal spores germinate, combine with an alga and grow together. Vegetative reproduction can occur by means of fragments breaking off the plant to form a new lichen. Lichens are able to colonise most surfaces which are not too shaded or smooth.

WHERE ARE THEY FOUND IN THE UK?

There are around 1,700 species of lichen found in Britain and Ireland. Lichens are found in a range of habitats growing throughout the UK. They are most widespread, with highest species diversity in areas with clean air and a mild, damp climate. Accordingly, Scotland, Wales, Devon, Cornwall and north-west England are the areas in the UK which support the best populations of lichens. A few areas of England, notably in Kent and East Anglia, still support good populations of lichens.

The UK has a better epiphytic lichen flora than the rest of northern Europe which is thought to be attributable to the higher number of surviving old trees and the prevailing westerly winds.

WHY ARE LICHENS OF CONSERVATION IMPORTANCE?

Until fairly recently, lower plants were not considered in conservation programmes and little was known about their distribution, ecology and habitat requirements. This situation has improved in recent years.

Lichens are of conservation importance for several reasons. Many lichens are extremely sensitive to atmospheric pollution and are killed when some chemicals, notably sulphur dioxide (SO₂), rise above a certain level. They are therefore good indicators of the levels of atmospheric pollution and environmental health. (There are a few species of lichen which are pollution tolerant and only occur in any quantities in polluted areas).

Lichens are an important component of the ecosystem

in which they are found. Because they are able to colonise bare substrate such as rock before vascular plants, their role in starting the process of rock breakdown and soil formation is of particular importance.

The relationships of lichens with other organisms means that they are a key element of the ecosystem. For example, epiphytic lichens on trees support a rich invertebrate fauna; lichen cover on tree trunks provides food, refuge and camouflage for large numbers of invertebrates. A number of moths have evolved a close relationship with lichens, particularly as a food source for caterpillars, notably the 17 British members of the subfamily Lithosiinae (footman moths), all have larvae which feed exclusively on lichens. A number of birds, including long-tailed tits, chaffinches, goldcrests and hawfinches use lichens to decorate and camouflage their nests.

LICHENS IN THE DURHAM AREA

HOW HEALTHY ARE THE LOCAL POPULATIONS OF LICHENS?

Over 600 species of lichen have been recorded in the natural habitats of the Durham area (notably at Hunstanworth Church where 80 species have been recorded). In contrast, in Durham City, only 10 lichen species are now present. With the exception of the immediate coastal strip the diversity of local populations of lichens declines from the west to the east of the Durham Plan area.

HOW MUCH DO WE KNOW ABOUT LICHENS IN THE DURHAM AREA ?

Lichens are distributed throughout the Durham area, from coastal piers to boulders at Killhope, at both natural and man-made sites. While the current number of reliably recorded species stands at 604, this is increasing as more survey work is undertaken and more records are collected. Since 1988, 84 new species have been added to the list for Vice-County 66 and a further 14 species which had not been recorded for many years have reappeared. Much of the interest in lichens in the Durham area comes from the work of local experts, particularly in habitats such as churchyards. As more work is done, so more species are identified in the Durham area. The fact that species lists are increasing at present is likely to be due, at least in part, to the recovery of lichen populations following the Clean Air Act of 1956.

The following species of lichen are of particular conservation interest and occur in the Durham area:

Bryoria capillaris: Status: rare - found in the Derwent

Lichens

Valley

Lobaria pulmonaria: (Lungwort) Status: very rare - found in Shipley Wood and Great Wood, Eggleston

Lopadium pezizoideum: Status: very rare - found at Horsleyhope, growing on oaks

Opegrapha paraxanthodes: Status: very rare - found at Hudstone Beck, growing on limestone - this is a UK BAP priority species

Peltigera degennii: Status: very rare - found in Derwent Gorge

Poeltulina cerebina: Status: RDB vulnerable - found at Cow Green, Upper Teesdale on limestone

Usnea wasmuthii: Status: Very rare - found in Upper Derwent Valley on oak

WHERE HAVE THEY BEEN FOUND IN THE DURHAM AREA ?

Within the Durham area, the west has some of the best habitats, climate and air quality and, therefore, higher numbers and species diversity of lichens. Here, the best habitats are to be found in sheltered, wooded valleys.

In the industrialised and urbanised eastern areas of the Durham Plan area, poor air quality, a drier climate and poorer quality habitat means that lichen species are reduced in terms of both number and diversity. Some specialised lichens are found along the coast (see the generic statement for Coastal Lichens).

LICHENS ARE AT RISK FROM:

Habitat loss - loss of old woodlands, heathland, grassland, wetlands and clean hard substrates as well as urban encroachment all adversely affect lichen populations. Minor losses have occurred through hard engineering on rivers, development of coastal defences, scrub encroachment on heath, infilling of old quarries, ploughing up of old pastures, loss of boundary features and inappropriate tree surgery and felling.

Atmospheric pollution - lichens require clean air to survive. Sulphur dioxide is the major component of atmospheric pollution which is detrimental to lichens, but other pollutants, notably nitrogen dioxide (NO₂) also adversely affect lichens. Poor air quality has led to the loss of many urban populations of lichens, although there are signs that air quality is currently improving.

Acid rain - the effect of increasing acidity on lichens in the UK has not been extensively studied. It is known that acid deposition causes a switch of substrate preference away from trees with readily acidified bark (such as oak) to those with better buffered bark (e.g. ash, elm).

Pollution - of land and water from agriculture and also coastal pollution. Many species of lichen are sensitive to increased levels of nitrates derived from animals, slurry spreading and aerial deposition. Lichens do not tolerate high concentrations of organic matter. As nutrient levels increase, so the rank growth of nettles and other nutrient demanding species increases;

lichens and bryophytes are unable to compete. Herbicides and pesticides are also detrimental to lichens.

Inappropriate management of habitats that are important for lichens - this is of particular relevance to churches and churchyards, where chemicals used to clean stones may kill lichens. The movement of gravestones from their original position and the planting of trees and shrubs that may shade gravestones can alter the lichen's abiotic environment.

Rare species of lichens with populations restricted to one or a few sites are vulnerable to natural catastrophe.

Some lichens, are very sensitive to the loss of canopy cover in woodlands, which reduces humidity; they may be restricted to areas with a long history of woodland cover.

Mollusc grazing - this is particularly relevant in woodlands, where arboreal slugs, such as *Limax marginatus*, feed on a wide range of lichens.

LICHENS BENEFIT FROM:

Reduced levels of atmospheric pollution (including SO₂, NO₂ and acid rain).

Continuity of habitat - this is particularly important for epiphytic lichens which have poor dispersal powers. Many are dependent on particular tree species. Lichens are slow growing and, therefore, are sensitive to disturbance.

Old woodlands with large old trees - open structured woods with glades provide suitable light levels for lichen growth.

Tree Preservation Orders - which protect mature, native trees that are valuable for their lichen flora.

The presence of hard, clean substrates for colonisation.

The re-creation of semi-natural habitats and, in some cases, policies of minimal intervention e.g. in upland oakwood.

Reduction in the adverse effects of agriculture such as pollution from the application of fertilisers and pesticides, and the loss of semi-natural habitat.

The use of agri-environment schemes to secure the sensitive management of habitats that are beneficial to lichens such as old meadows and pastures, lowland heaths, upland woodlands and field boundaries.

The presence of sheltered sites such as dense woodlands, tall herbage, deep valleys and crevices in stonework.

Man-made habitats such as churchyards - these are of particular importance in areas where there are no natural rock outcrops. Both church buildings them-

Lichens

selves and their associated graveyards provide a multitude of suitable niches for lichens, if they are sensitively managed.

The application of appropriate substances to new buildings to encourage more rapid lichen colonisation. For example, the spraying of dilute cow slurry on new alkaline concrete and powdered chalk on acid stonework such as granite and sandstone.

Further research and monitoring into their ecology and conservation requirements.

IMPORTANT HABITATS FOR LICHENS:

Hard substrates - walls, bridges, gravestones, roofing tiles
Deciduous woodland
Coniferous woodland
Unimproved grassland
Heaths and moors
Rocks
Rocky shores
Churchyards, churches and old buildings
Parkland trees in sheltered, well-lit, moist situations
Sparsely vegetated, old mine sites

OTHER SPECIES AND HABITAT ACTION PLANS COVERING ISSUES RELEVANT TO LICHENS

<i>Lowland heathland</i>	**
<i>Rocky shores</i>	***
<i>Coastal ash woodland</i>	**
<i>Upland heathland and blanket bog</i>	*
<i>Coniferous woodlands</i>	*
<i>Urban habitats</i>	*
<i>Coastal lichens</i>	***
<i>Upland oakwood</i>	**
<i>Fungi</i>	***

N.B. ** indicates action plan produced in 1998.

* indicates action plan produced in 2000.

*** indicates action plan produced in 2001

LICHENS AND THE LAW

There are no protected species of lichen in the Durham area.

TARGETS FOR THE CONSERVATION OF LICHENS IN THE DURHAM AREA:

	DATE
Target 1 <i>Maintain the current population of lichens in the Durham Plan area.</i>	ONGOING
Target 2 <i>Enhance the knowledge of the number and diversity of lichens in the Durham Plan area by increasing the number of accurate records by 5% each year by between 2002 and 2005.</i>	2005
Target 3 <i>Support the setting up and maintenance a database for local lichen records.</i>	2002
Target 4 <i>Provide guidance for 50 local land owners and managers regarding the conservation of lichens by 2002 and for 200 in total by 2005.</i>	2005
Target 5 <i>Raise general awareness of lichens, their diversity and ecological importance, by organising 5 lichen-related events (public/media) by 2005.</i>	2005

Lichens

LICHENS ACTIONS			
ACTION	DATE	POSSIBLE PARTNERS	MEETS TARGET NO.
<u>POLICY AND LEGISLATION</u> 1. Consider the designation of protected areas for their lichen interest.	2002 ONWARDS	EN, DWT, DBAP, BLS, Local Experts, LAs	1
<u>SPECIES MANAGEMENT AND PROTECTION</u> 2. Identify habitats of conservation importance in the Durham area. 3. Encourage site managers and land owners to survey and record lichen species present on their land. 4. Encourage site managers to include contingencies for lichens in the production of management plans and practical site management.	ONGOING 2005 ONWARDS 2005 ONWARDS	DWT, DBAP, EN, BLS, Local Experts DWT, DBAP, EN, Local Experts DWT, LAs, EN, NT	1 1, 2 1
<u>RESEARCH AND MONITORING</u> 5. Provide support for the maintenance of a database of lichen records in the Durham area. 6. Encourage submission of all records to the Local Records Centre. 7. Investigate the ecology of lichens in the Durham area. 8. Identify habitats of conservation importance for lichens in County Durham. 9. Identify any species that are rare, scarce, under threat or in decline.	ONGOING ONGOING ONGOING ONGOING ONGOING	EN, DCC, EDC, DWT, DBAP, BLS, Universities, LRC All Partners, Local Partners Universities, Local Experts EN, DWT, BLS, Local Experts BLS, Local Experts, DWT, EN	1, 3 2, 3 1 1 1, 2
<u>ADVISORY</u> 10. Increase general awareness of lichens amongst landowners, land managers and the public at large. 11. Provide management guidance to relevant land owners, managers and architects.	2005 2005	LAs, EN, DBAP, DWT DBAP, DWT, EN, FWAG, DEFRA	1, 2, 4 1, 2, 4
<u>COMMUNICATIONS AND PUBLICITY</u> 12. Increase public awareness of the ecological importance of lichens and their conservation, by means of events, and the provision of interpretation.	2005	CA, DBAP, LAs, DWT, EN, Local Experts	1, 2, 4, 5