

Lichens



General Info

Lichens add amazing colour and texture to our surroundings, up close you will notice they have beautiful and intricate structures. Some even form patterns that look a little like hieroglyphics or scribbled writing. They grow on trees, rocky surfaces and manmade stone structures. They can provide homes to insects or nesting material for birds. If you look closely at the trees around the course you will see they are covered in lichens.



Box of Knowledge:

Some lichens have pungent and unpleasant aromas; a few even smell a bit like fish. Others are a lot more fragrant and have even been used to make

What are they?

Lichens are not a single living thing but are a successful (symbiotic) partnership between two species, a fungus and an alga or cyanobacteria. The majority of lichens have alga photobionts, with only about 10% containing cyanobacteria. The fungus provides a protective home for the alga and in return, the alga produces food for the fungus from sunshine, water and air. Fungi require carbon as a food source; this is provided by the algae (and/or photosynthetic cyanobacteria). They create sugars through photosynthesis on which fungi can feed. In return the fungi provide optimum living conditions for the bacteria or algae population as well as providing access to mineral nutrients produced by fungal digestion. The interior of lichens are filled with chemicals found nowhere else in nature, these compounds could help protect the photobionts from UV radiation, desiccation, and from being eaten by animals.

Lichen and Fungi

Fungi come in many different shapes and sizes, most species are the classic toadstool shape with a cap and stem but also included are some that grow out of wood like small shelves or brackets and others that have a corallike shape. Some grow alone, in troops or clusters. They are not plants as they do not photosynthesise but are members of their own kingdom of species distinct from plantlife. They are essential to the health of all ecological systems and without them over 85% of our plants and trees would not survive. The parts of a fungus that we see above ground are the spore producing structures or fruit bodies of a much larger organism that is mostly hidden from sight and composed of a branching network of filamentous cells. This underground network, called the 'mycelium', enables fungi to acquire nutrients amongst plant litter and wood and, for some species, to link up with the roots of living trees in a symbiotic 'mycorrhizal' relationship wherein both partners gain nutrients. Many different types of fungi also form lichens; these include mushroom-forming and cup-fungi. About 98% of lichens belong to cup fungi families and it is these that produce almost all of the familiar and colourful crusts, rosette-forming, leafy types, and shrubby lichens that many people recognise. Current estimates also suggest that one fifth of all known fungi are lichenised.



Habitat

Lichens grow very slowly, some less than a millimetre per year, and can take many years to establish in new locations. This is fine for species that live in remote and undisturbed places, but can be a problem for some species that share their habitats with us. Some species of lichen are common and widespread. However, others are in decline and could face extinction if we do not carefully manage our environment. Two of the greatest threats are loss of undisturbed habitats through land-use change and the aggressive growth of non-native species such as *Rhododendron ponticum*. Areas that are of particular importance for lichens are protected by a series of international and national site designations with some species protected by law.

Many lichens have a remarkable tolerance to drying out, they can survive extremes of heat and cold; this means that they can tolerate being scorched by the sun in summer months, yet also survive ice and snow, and are therefore able to grow higher up in the mountains than other plants. Some rock-dwelling lichens can survive many hundreds of years and are among the oldest living organisms in Scotland.



Box of Knowledge:

The browns and fawns of Harris tweed were produced from a closely-related group of lichens called crottle. (The Gaelic name for Lichen is crottle or crotal). The last of a long line of commercial dyers and hand weavers of this cloth on Harris ceased production in 1997.



Scotland's Lichens

Scotland has a diverse population of lichens (around 1500 species). The clean air, diverse habitats, relatively cool summers and mild winters all contribute to their abundance. Scottish lichens come in many colours: grey, white, black, yellow, orange, green, pink. Most grow as crusts, some are leafy, while others are more shrub-like in appearance. It is not just the woodland areas of Scotland that contain a diversity of Lichen, as anyone venturing onto the high ground of the Cairngorm plateau will find it to be a lichen-dominated wilderness. There are also sizable lichen populations to be found on the vast bird colonies such as those on the island of St Kilda.



Box of Knowledge

Medieval doctors believed that many fungi had special medicinal properties, this was in part due to the resemblance many have to parts of the human anatomy. The fungi commonly known as *lungwort* was thought to ease ailments of the lungs due to the underside of its lobes bearing a resemblance to the inside of a lung. They also believed that *dog Lichen* was a cure for the bite of a mad dog because its underside had structures that bore a resemblance to fangs.

Lichen - Keywords

Alga (singular)/Algae (plural) - Any of the numerous groups of chlorophyll containing, mostly aquatic eukaryotic organisms ranging from microscopic single celled forms to multicellular forms, distinguished from plants by the absence of roots, stems, and leaves and by a lack of non-reproductive cells in their productive structures.

Cyanobacteria - A group of photosynthetic bacteria also known as blue-green algae.

Fungus (singular)/Fungi (plural) - Organisms that lack chlorophyll, leaves, true stems, and roots, reproduce by spores. The group includes moulds, mildews, rusts, yeasts and mushrooms.

Photobiont - The photosynthetic partner of a symbiotic pair: For example, the algal component of the fungal-algal association in lichens.

Photosynthesis - The process by which carbon dioxide, water, and certain inorganic salts are converted into carbohydrates by green plants, algae, and certain bacteria, using energy from the sun and chlorophyll.

Symbiotic - Living in symbiosis, or having an interdependent relationship.

Symbiosis - A close and usually obligatory association of two organisms of different species that live together, often to their mutual benefit.



References:

The British Lichen Society (no date). *What is a Lichen?* Available at: www.thebls.org.uk/about-lichens/what-is-a-lichen (Accessed: 14 February 2014).

Scottish Natural Heritage (2013) *Lichens*. Available at: <http://www.snh.gov.uk/about-scotlands-nature/species/lichens/> (Accessed 14 March 2014).

Scottish Natural Heritage (no date) *Lichens - naturally Scottish*. Available at: <http://www.snh.org.uk/publications/on-line/NaturallyScottish/lichens/biodiversity.asp> (Accessed 17 March 2014).