

Lichens

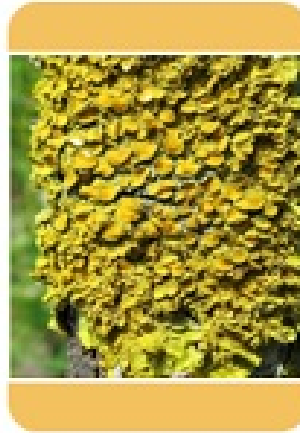
MAJOR TYPES OF LICHEN



CRUSTOSE



FOLIOSE



SQUAMULOSE



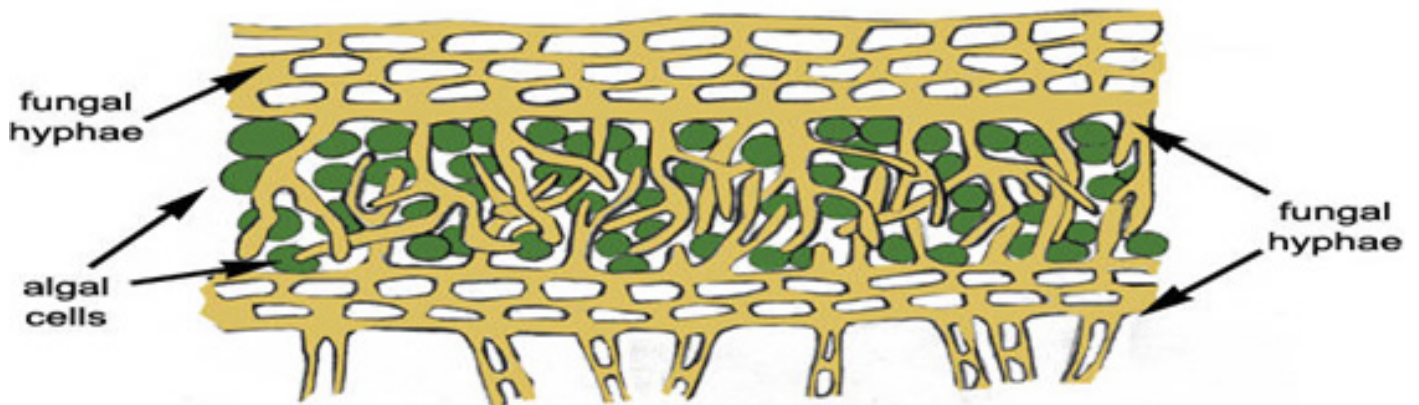
FRUTICOSE

The very first lichens date back to before the origin of land plants, when most of the biodiversity of Earth was in the sea. There are about 17,000 species of lichen worldwide that occur in four basic growth forms, responding to differing habitats:

- Crustose – crust like growth, found mainly on marine rock
- Squamulose - tightly clustered and slightly flattened pebble-like units, an intermediate between fruticose and foliose
- Foliose – leaf like, with flat sheets of tissue and grows in varied environments
- Fruticose – free standing branching tubes that grow in extreme habitats as it can cope with desiccation (drying)

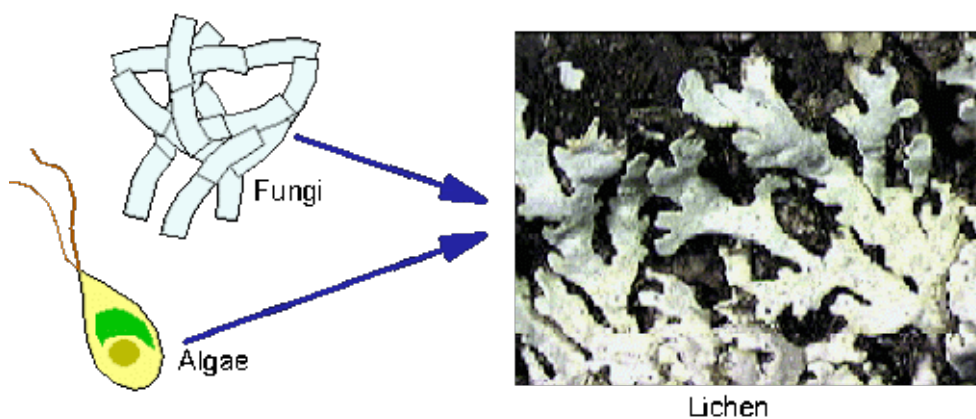
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Lichens are made up of two or more closely interacting, mutually beneficial organisms that exist within a relationship called symbiosis.



The construction of a lichen includes a fungus and algae or cyanobacteria. Fungi lack the ability to generate their own nutrition via photosynthesis, whilst algae and cyanobacteria can harness the energy of the sun via their green chlorophyll. They turn carbon dioxide and water into simple, digestible sugars.

The fungus is the dominant partner in this association, ensuring that it has access to a continuous source of nourishment and derives nitrogen through the activity of its symbiotic partners.



In return, fungi form a protective outer shell around the algae or cyanobacteria containing pigments that protect them from damaging ultraviolet rays, from drying out and, often, from potential destruction by grazing herbivores.

Different kinds of lichens have adapted to survive in some of the most extreme environments on Earth - across arctic tundra, hot dry deserts and rocky coasts.



Lichens in the Namib desert



Lichen growing in the Arctic tundra

Lichen are useful to other wildlife, offering nesting material and food for birds, as well as shelter for many insects that, in turn, are the food sources for other creatures. Woods rich in lichens support more wildlife than any other natural environment.

Ancient woodland, land that has been continually wooded and little disturbed for at least 400 years, is an ideal environment for lichens that are extremely slow growing, developing at a rate of 1 or 2 millimetres a year.

Some lichen species require alkaline conditions and grow exclusively on old bark that, like ash, become more alkaline with age. In fact there 536 species of lichen that depend upon ash in ancient woodland.



When dry, lichens take on the colour of the fungus itself or can be drab and grey. However, when wet, they become a blaze of colour. This is because the fungal cells in the upper cortex become transparent and the colours of the algal or cyanobacterial layers can shine through. Green algae give lichens a bright green colour, while cyanobacteria give hues of dark green, brown, or black.



Lichens are excellent indicators of pollution and air quality as they absorb heavy metals such as carbon and sulphur into their bodies. Extracting these pollutants in a process called bio-monitoring, gives an indication of the levels of pollutant particles in the atmosphere.

Lichens contribute to a phenomenon known as biological weathering. They break down rocks and release minerals by producing certain chemicals. Lichens can also disrupt rock surfaces simply by physically attaching to them.

Weathering can lead to the eventual disintegration of rocks. Whilst this is a problem when lichens grow on building stones, it is an essential step in the formation of primitive soils. When lichens decompose, the organic matter that left behind provide the basis for the development of new soil strata.



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Most lichens reproduce asexually; when conditions are good they will simply expand across the surface of the rock or tree. In dry conditions they become crumbly and small pieces will break off and are dispersed by the wind. The fungal component of many lichens will also sometimes reproduce sexually to produce spores.

In the absence of moisture, lichens will dry out, but not dehydrate to the point of death. As soon as water is available, they become plump and fleshy again. When dry and brittle, small pieces of lichen break off the main body and form new units that come into life when wet.



Lungwort lichen when dry



Lungwort lichen when wet