

LICHENS

Lichens are associations that arise from algae or cyanobacteria (photobiont) living among filaments of multiple fungi (mycobiont) in a mutualistic relationship. Lichens are regarded as a special group of fungi which is also known as lichenized fungi. Lichens are very common on earth and about 13500 species exist and they cover approximately 6% of Earth's land surface. Some of them grow on the bark of temperate trees or as epiphytes on the leaves of trees in tropical rain forests. Others occupy some of the most inhospitable environments on earth, growing on cooled lava flows and bare rock surfaces, where they help in the process of soil formation, and on desert sands where they help to stabilize the surface and enrich it with nutrients. Some other types of lichen grow abundantly on tundra soils, providing a vital winter food source for animals in arctic and sub-arctic regions. Lichens are considered to be among the oldest living things and they are among the first living things to grow on a fresh rock exposed after an event such as a landslide. The long life-span and slow and regular growth rate of some lichens can be used to date events.

Lichens grow in a wide range of shapes and forms. Vegetative body parts of a lichen are called the thallus. Lichens are grouped by thallus type. There are three major morphological types of thallus (Foliose, Fruticose, and Crustose). Foliose lichens have a flat, leaf-like structure. **Foliose** lichens are leaflike in both appearance and structure. They adhere to their substrate loosely. **Crustose** lichens are crust-like and they are tightly attached to or embedded in their substrate and have no lower cortex. They consist of about 75 percent of all lichens on earth. **Fruticose** lichens have no distinct top and bottom and are often round in cross-section. Their thalli may be upright, shrubby, or of pendulous strands.

Reproduction in lichens may be either sexual or vegetative (asexual). In asexual reproduction, fragments of the thallus containing both the photobiont and the mycobiont separate and form into a new lichen. This may happen when a piece of the thallus is

accidentally broken off, but specialized structures that have evolved in lichens, namely isidia and soredia, usually carry out this type of reproduction.

In most lichens undergoing sexual reproduction, tiny spores are produced within an ascus. The asci form inside of structures called ascomata. The most common type of ascoma, called an apothecium, is shaped like an open disc. In sexual reproduction, only the fungal partner is reproduced. The spores that germinate must find the appropriate photobiont in order to form a new lichen. Since this is an undependable type of reproduction, vegetative reproduction is very important.

The term “mycobiont” is the fungal component of a lichen and it could be a member of Ascomycete or Basidiomycete. The associated lichens are called either ascolichens or basidiolichens, respectively.

Ascolichens: The lichens whose mycobiont belong to division *Ascomycota* is known as ascolichens. Its fruiting body could be either perithecial or apothecial.

Genus: *Usnea*

The includes over 350 species that are widely distributed in polar, temperate and tropical regions. The genus is recognized based on the fruticose thallus, branches with a cartilaginous central axis and the presence of usnic acid in the cortex.

Genus: *Parmelia*

The genus has foliose thallus whose upper surface is pale bluish-gray to light brown, the lower surface is black and has rhizines anchoring it to the substrate.

Genus: *Collema*

Collema members are homomeric lichens that have cyanobacterium (Nostoc) photobiont.

Genus: *Cladonia*

Cladonia, a genus of moss-like lichens, contains over 400 species worldwide. The genus members are of economic importance to reindeer-herders, such as the Sami in Scandinavia or the Nenets in Russia.

Genus: *Lecanora*

Lecanora includes 800 widely distributed species. The genus is characterized by its crustose or placodioid thallus with lecanorine apothecia

Genus: *Cetraria*

Cetraria is a genus of fruticose lichens that occur at high latitudes. The genus is characterized by strap-like form, with spiny lobe edges. *Cetraria islandica*, also known as Iceland moss, grows in alpine areas of the northern hemisphere and it is an important food for reindeer, caribou, musk-oxen, and moose.

Genus: *Xanthoria*

Xanthoria, also known as orange wall, is foliose lichen. Its members have a color because of the lichen substance parietin.

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Url2.: <http://archive.bio.ed.ac.uk/jdeacon/microbes/lichen.htm>

Url3.: <http://www.ucmp.berkeley.edu/fungi/lichens/lichensy.html>

