

## Quadrant II – Transcript and Related Materials

**Programme:** Bachelor of Science (First Year)

**Subject:** Botany

**Course Code:** BOC 101

**Course Title:** Biodiversity I (Microbes, Algae, Fungi and Bryophytes)

**Unit:** Fungi

**Module Name:** Lichens- General account

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### Notes

#### Introduction to lichens

Lichen is an association of a fungus and a photosynthetic symbiont, resulting in a stable thallus of specific structure. It is also defined as, a stable self-supporting association of a mycobiont and a photobiont. Here, the photosynthetic symbiont or the photobiont can be a green alga or a cyanobacterium (earlier referred to as blue-green alga) while the mycobiont is an ascomycetous or basidiomycetous fungus.

The characters of a lichen are unique and neither of the partners alone have those features.

#### Details of photobiont

The photobiont carries out photosynthesis. Most (about 70-80%) of the photosynthate produced by the photobiont is incorporated into the fungal hyphae.

Around 37 genera of algae and cyanobacteria are known to form lichens. Some of the common Chlorophyta (green algal) genera are *Trebouxia*, *Chlorella* and *Cephaleuros*. Some of the common cyanobacterial genera are *Nostoc*, *Anabaena*, *Calothrix* and *Scytonema*.

### **Details of mycobiont**

The mycobiont provides the algal cells with water and nutrients. It also protects the algal cells from high light intensity.

There are approximately, 14,000 species of lichenized fungi known. Most of these are members of Ascomycota belonging to Discomycetes or Pyrenomycetes. Some are members of Loculoascomycetes. Some Basidiomycota members are also known. Common lichen forming basidiomycetous genera include *Dictyonema*, *Omphalina* and *Multiclavula*.

### **Occurrence**

Lichens have a worldwide distribution. They grow on soil, rocks, trees (leaves and bark) and even walls. They have been reported from variety of habitats ranging from cold to hot and arid to moist regions of the world. A number of species have been reported to be present on seashores only. Lichens form a dominant vegetation in polar regions where other plants are scarcely found.

Lichens are the pioneer species during primary ecological succession. They are involved in weathering of rocks and formation of soil and thus makes the region habitable to succeeding organisms.

It is interesting to note that, the autotroph (photobiont) may be found free living but the fungal symbiont (mycobiont) is never found in its free-living form.

### **Growth rate**

Lichens exhibit slow growth rates. Most lichens grow at rates of 0.5 to 8 mm per year. Environmental factors that affect the lichen growth rates include light, temperature and moisture.

### **Classification of lichens**

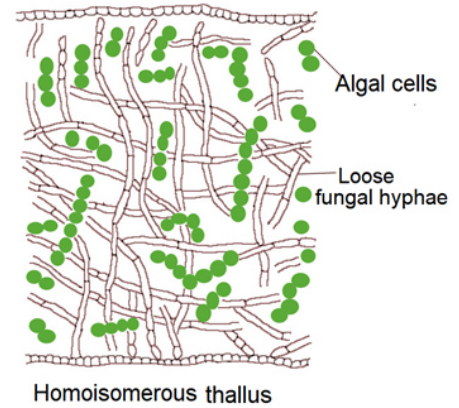
Based on its fungal partner, lichens are classified into two, ascolichens and basidiolichens.

1. Ascolichens- the lichens in which the fungal symbiont is an Ascomycota member.
2. Basidiolichens- the lichens in which the fungal symbiont is a Basidiomycota member.

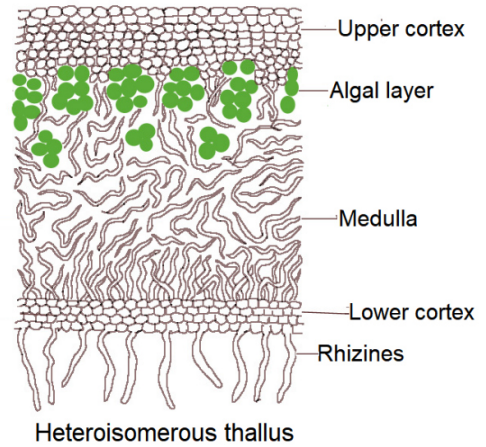
### **Other groupings of lichens**

1. Based on its thallus structure, lichens are grouped into six types, namely:
  - i. Leprose- These lichens have the simplest type of thalli. Here, the fungal hyphae envelope small clusters of algal cells. They grow superficially over the substratum and has a powdery appearance.
  - ii. Crustose- In these lichens, the thallus is closely adhered to the substratum and has a crust-like appearance. Here, the photobiont cells are covered by a distinct layer of fungal tissue.
  - iii. Foliose- In these lichens, the thallus is flat, leaf-like, lobed and attached to the substratum with the help of rhizoids.
  - iv. Fruticose- In these lichens, the thallus is well-branched, erect or pendulous.
  - v. Filamentous- In these lichens, the thallus is a mass of thin, stringy filaments (of photobiont) surrounded by sheaths of fungal filaments.
2. Based on the habitat in which they occur, lichens are grouped in six types, namely:
  - i. Corticolous- Lichens which grow on bark of trees.
  - ii. Lignicolous- Lichens which grow directly on wood.
  - iii. Saxicolous- Lichens which grow on rocky substrata.
  - iv. Terricolous- Lichens which grow on soil.
  - v. Marine- Lichens which grow on siliceous rocky seashores.
  - vi. Freshwater- Lichens which grow on hard siliceous rocks in freshwater.
3. Based on the distribution of algal component in the thallus, lichens are grouped into two, namely:

- i. Homoisomerous- Lichens in which the algal component is uniformly distributed in the fungal component. Here, the thallus is simple in composition and is not much differentiated.



- ii. Heteroisomerous- Lichens in which the algal component is limited to certain area of the thallus. The thallus thus has a layered structure and is differentiated into cortex, algal layer and medulla.



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