

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- Reproduction and significance

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Notes

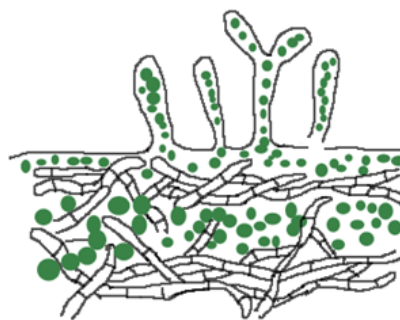
Reproduction in lichens

Lichens reproduce by the following methods:

1. Vegetative mode

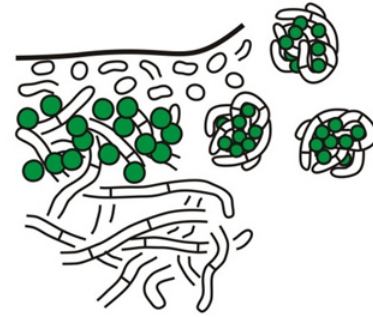
a. Common methods

- i. **Fragmentation**- In foliose and fruticose lichens, thallus breaks into small fragments each of which develops into a new thallus.
- ii. **Isidia**- (*singular* isidium) Isidia are small, corticated outgrowths made up of both fungal hyphae and algal cells. They are situated on the upper surface of the thallus. They get constricted and break off from the thallus to develop into a new thallus.



Isidia

- iii. **Soredia-** (*singular* soredium) Soredia are small, non-corticated, bud-like, powdery masses made up of few algal cells surrounded by few fungal hyphae. They develop either over the entire upper surface or in special pustule-like areas called soralia. Each soredium can develop into a new thallus.



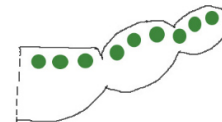
Soredia

b. Rare methods

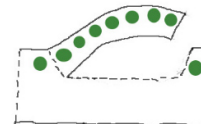
- i. **Phyllidia-** (*singular* phyllidium) Phyllidia are abstricted, leaf or scale-like, dorsiventral portions of the thallus of some foliose lichens.
- ii. **Blastidia-** (*singular* blastidium) Blastidia are yeast-like segmented propagules of some lichens.
- iii. **Schizidia-** (*singular* schizidium) Schizidia are split, scale-like segments of some lichens made up of only upper layer of the thallus.
- iv. **Goniocysts-** When an algal cell remains wrapped in fungal hyphae in the form of an unsorallium-like structure it is called goniocyst.
- v. **Hormocysts-** When algal filaments and fungal hyphae grow together in a chain-like manner and break into clumps it is called hormocyst.



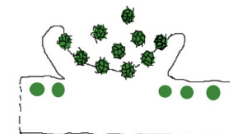
Phyllidium



Blastidium



Schizidium



Goniocysts



Hormocysts

2. Asexual mode

- a. **Conidia**- Conidia of different shape and size develop in special immersed, flask-shaped, multi-hyphal structures called conidiomata (pycnidia).
- b. **Oidia**- Hyphae of certain lichens break up into small bodies called oidia.

The spores released through asexual mode (conidia or oidia) do not carry the photobiont component. The spores germinate into new hyphae which comes in contact with suitable photobiont and undergoes combined growth to form the new lichen thallus. If the hyphae do not come in contact with suitable photobiont, it dies off.

3. Sexual mode (by the fungal partner)

In ascolichens or basidiolichens, the fungal partner produces ascospores or basidiospores, respectively. These spores on discharge, start germination by producing hyphal branches. The spores do not carry the photobiont component at the time of discharge. The growing hyphae comes in contact with suitable photobiont. Combined growth of the fungus and alga results in formation of lichen thallus. If the hyphae do not come in contact with suitable photobiont, it dies off.

Significance of lichens

1. **Biological weathering and pedogenesis**- Saxicolous lichens initiate weathering of rocks by secretion of some organic acids by the mycobiont. This leads to formation of new soil (pedogenesis).
2. **Environmental indicators**- Lichens are sensitive to air pollution, particularly SO_2 and therefore are used as environmental indicators to identify pollution free areas.
3. **Yield natural products**- Over 550 different natural products unique to lichens have been identified.
4. **Source of medicine**- Usnic acid produced by many lichens have antibiotic, tumour-inhibiting, spasmolytic and virucidal properties. Erythrin is used to treat

heart diseases. Certain other lichens have anti-tumour, anti-cancer, anti-tuberculosis and hallucinogenic properties.

5. **Source of dyes-** Members of genus *Ochrolechia* are used to produce red and purple dyes. Brown dye used in wool and silk fibres is obtained from *Parmelia omphalodes*. Members of *Roccella* and *Lasallia* are used to prepare litmus paper.
 6. **Source of food-** Species of *Parmelia*, *Lecanora* and *Cetraria* are eaten by human, horses, cattle, etc. in some form or other. *Cladonia* serves as a common food for many animals in Tundra region.
 7. **Source of essential oil/perfumes-** Members of genus *Evernia* contain essential oil and are used to produce perfumes.
 8. **Materials for religious purposes-** Lichens are used in the manufacture of 'dhoop' and 'havan samagries'.
 9. **Source of poison-** *Letharia* is used as a poison for wolves.
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