

MYCOLOGY PART- 6

FUNGAL ASSOCIATION

1. SYMBIOSIS

- **Mutualism**: both partners are benefited
- **Parasitism**: one of the two partners lives at the expense of the other.
- **Commensalism**: only one partner is benefited and there is no disadvantage to the other.

2. SAPROPHYTISM

- Responsible for **breaking down and recycling dead plant and animal material**.
- These are the fruit-bodies you see on dead trees, leaf litter, animal bones, even faeces.
- Saprophytic fungi release enzymes to break down and **digest the lignin, cellulose or chitin in this material into simple soluble compounds** that can be absorbed by them, and by plants, as nutrient.

3. MYCORRHIZA

- It is a **mutual symbiotic association between a fungus and a plant**.
- The **plant makes organic molecules** such as sugars by photosynthesis and supplies them to the fungus, and the **fungus supplies to the plant water and mineral nutrients**, such as phosphorus, taken from the soil.

Types

- *Ectomycorrhizae*
- *Endomycorrhizae*
- *Ectenodomycorrhizae*

i. Ectomycorrhizae

- Sheathing mycorrhizae.
- Forms a sheath around the root.
- Ectomycorrhizas consist of a **hyphal sheath**, or mantle, covering the root tip and a Hartig net of hyphae surrounding the plant cells within the root cortex.
- Mostly in **Basidiomycetes** and **Zygomycetes**.

ii. Endomycorrhizae

- **Penetrate into the root cortex** and form nutrient exchange structure within root cells.
- Types
 - **Vasicular- Arbuscular mycorrhiza**
 - **Ericoid mycorrhiza**
 - **orchid mycorrhizas**

Ericoid mycorrhiza

- Found between **Ascomycetes** and plants of the **family Ericaceae** and **Epacridaceae**.

orchid mycorrhizas

- All orchids are myco-heterotrophic at some stage during their lifecycle and form orchid mycorrhizas with a range of **basidiomycete fungi**.
- Their hyphae penetrate into the root cells and form pelotons (coils) for nutrient exchange.

Vasicular- Arbuscular mycorrhiza

- whose hyphae penetrate plant cells, producing structures that are either **balloon-like (vesicles)** or **dichotomously branching invaginations (arbuscules)** as a means of nutrient exchange.
- The fungal **hyphae do not in fact penetrate the protoplast** (i.e. the interior of the cell), but invaginate the cell membrane. The structure of the arbuscules greatly increases the contact surface area between the hypha and the cell cytoplasm to facilitate the transfer of nutrients between them.

iii. Ectenodomycorrhizae

- **Both the characters of ecto and endomycorrhizae.**
- Forms **hartig net** and **hyphal sheath**.
- Establishes **haustoria**

4. ENDOPHYTES

- Lives within a plant
- Donot cause any diseases
- E,g., **Alternaria, Fusarium**
- Beneficial to plant because it improves growth, yield fitness and help the plant to tolerate both biotic and abiotic stress.
- Helps in biodegradation of host plant litter.
- Fixes nitrogen and carbon
- Helps in defence mechanism

5. LICHENS

- Symbiotic relation between algae and fungi.
- Fugus along with green alage or blue- green alage
- Fungal part: **mycobiont**
- Algal part: **phycobiont**

- Fungus provide physical support, attachment, absorbs water and minerals,
- Algae performs photosynthesis

Classification based on fungal components

- i. Ascolichens**
 - Fungal partner member of ascomycota
 - Algal partner- blue- green algae
- ii. Basidiolichens**
 - Fungal partner member of basidiomycota
 - Algal partner- blue- green algae
- iii. Deuterolichens**
 - Fungal partner member of dueteromycota
 - Sexually sterile and will not produces sexual spores

