

FUNGI

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FUNGI:

- Fungi (singular-fungus) are a special group of plants that lack chlorophyll and include thalloid eukaryotic heterotrophic organisms of variable forms.
- It includes yeasts, molds, mildews, mushrooms, rusts, smuts, etc.
- The word 'fungus' originated from Latin word 'fungus' meaning mushroom, which in turn derived from the Greek word 'sphongos' which refers to the macroscopic structures and morphology of mushrooms and molds.
- The scientific study of fungi is known as '**Mycology**'

Status of fungi in the living world:

- Mushrooms were known since the beginning of human civilization but the scientific consideration of fungi began from the period of Carolus Linnaeus.
- Linnaeus recognised fungi as a group of non-flowering plants and kept them in the 24th order Cryptogamia along with algae.
- Haeckel (1866) and Copeland (1938) included Fungi under the Kingdom Protista.
- Whittaker (1969) recognised fungi as a separate kingdom and separated them from the Protista.
- In the domain concept proposed by Woese et al. (1990)

Occurrence (habitat) and Distribution

- Fungi is a large group including more than 1,00,000 sp. distributed throughout the world.
- They are cosmopolitan and occur in almost every habitat where organic material is available.
- Since they lack chlorophyll and cannot perform photosynthesis, they do not require light for active growth and metabolism.
- Fungi flourish well in moist, dark and warm conditions but their presence at or below freezing temperature as well as in hot deserts has also been reported.
- The most usual habitat of fungi is wet soil rich in humus.

Depending on their habitats, fungi may be categorised as follows:

1. **Soil fungi**: Fungi are dominant in acidic soils but are also present in neutral and alkaline soil.

Examples: *Agaricus*, *Morchella*, *Peziza*, *Aspergillus*, *Penicillium*, *Rhizoctonia*



2. Mycorrhizal Fungi:

Fungi occurring in close association with the roots of higher plants are called mycorrhizal fungi.

Examples: *Rhizoctonia*, *Amanita*, *Boletus*, *Fomes*, etc.



3. Coprophilous Fungi:

Fungi growing on dung of herbivorous are called coprophilous fungi.

Examples: *Coprobria*, *Ascobolus*, etc.



4. Aquatic Fungi:

Some lower fungi are aquatic and occur in fresh water bodies.

Examples: *Saprolegnia*, *Allomyces*, etc.

Digitaria marina and *Nia vibrissae* are common marine fungi.

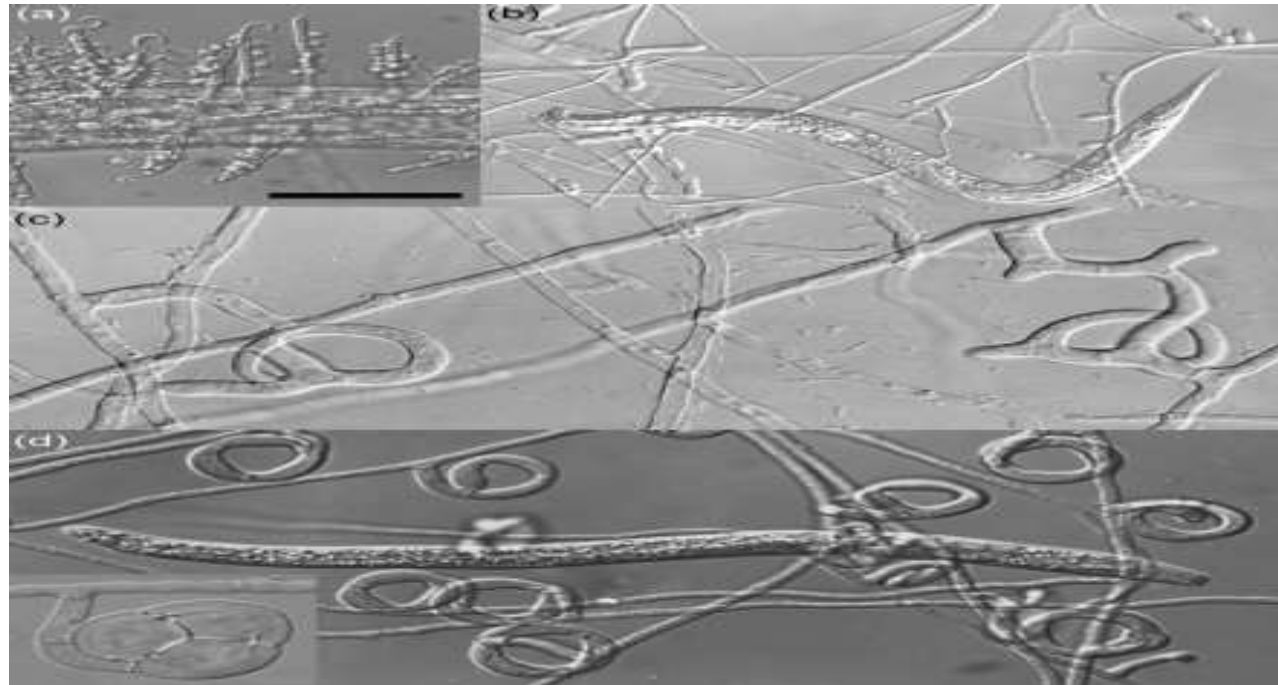


Psathyrella aquatica
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5. Predaceous Fungi:

These are parasitic fungi which consume protozoans, insects and nematodes. They capture their prey by various trapping structures such as sticky nets, sticky knobs, sticky loops, etc.

Examples: *Dactylaria candida*, *Monacrosporium*, *Arthrobotrys*, etc.



6. Entomogenous Fungi:

Fungi growing on the body surface of some insects are called entomogenous fungi.

Examples: *Entomophthora music* grows on the body of Housefly, *Coelomyces* sp. grow on mosquito larvae.

7. Cellulose decomposing fungi:

These fungi grow on substratum rich in cellulose and cause its decomposition. They grow on paper, cotton, starch coated fibres, etc.

Examples: *Chaetomium globosum*, *Stachybotrys atra*, etc.

8. Lignicolous Fungi:

These fungi grow on wood and woody materials. They decompose lignin and cause destruction of wood.

Examples: *Polystictus sanguineus*, *Polyporus*, etc.

9. Keratinophilic fungi:

These fungi grow on keratinised tissues of skin, hair, finger nails and feathers. These fungi obtain energy by degrading keratin. They cause diseases of skin and hair.s

Examples: *Keratinomyces*, *Trichophyton*, *Microsporium*, etc.

Habit (mode of life) of fungi:

1. **Saprophytes**: It includes all those fungi which obtain their food from dead and decaying organic matter. The Saprophytes are further divided into –

a. **Obligate Saprophytes**: It includes fungi which get their food from dead decaying organic matter and cannot grow on living host i.e. they are true saprophytes.

Eg.: *Peziza*, *Morchella*, *Agaricus*, etc

b. **Facultative saprophytes**: These fungi usually grow practically on living organisms but under changed circumstances, they have ability to grow as saprophytes on dead and decaying organic matter.

Eg. *Phytophthora infestans*, *Ustiligo*, *Taphrina deformans*, etc

Habit (mode of life) of fungi: cont...

2. **Parasites:** It includes fungi which live on other living organism and obtain their food i.e. nutrient from the living tissues upon which they live. They develop specialized and modified absorbing organs called haustoria. The living organisms from which the parasitic fungi draw food are called the hosts. Different types of parasitism found in fungi are:

a. **Obligate parasites:** They are the true parasites and restricted only to living host tissues. They fail to grow on artificial media. Luttrell (1974) divided obligate into 3 categories –

i. **Biotrophs:** The parasites which obtain their food from the living tissues on which they complete their life cycles.

Eg.: *Albergo*, *Puccinia*, *Sphaerotheca*, *Erysiphe*, etc.

Habit (mode of life) of fungi: cont...

- ii. **Hemi biotrophs** – They attack living tissues in the same way as biotrophs but continue to develop and sporulate after the tissue is dead.

Eg.: Leaf spot fungi

- iii. **Perth tropes** – They kill the host tissue in advance and their nourishment saprophytically.

Eg.: *Sclerotium roffsi*

- b. **Facultative parasite**:- These fungi usually grow saprophytically on dead and decaying organic matter but under changed circumstances, they have ability to grow as parasite on living organisms.

Eg.: *Fusarium*, *Pythium*, *Pestalotia* etc

Habit (mode of life) of fungi: cont...

Parasitic fungi again may be –

1. **Ectoparasites** – When parasitic fungi grow superficially on the surface of the host plant without penetrating the host tissue. They are provided with special organs of attachment known as **appressoria**.
2. **Endoparasites** – When fungi penetrate the host and ramify their veg. body within the tissue of the host, they are called endoparasites.

Besides, as parasites or as saprophytes, fungi sometimes live in close association with algae (eg. Lichens). Such mode of life is known as **biosis**. In this type of association, both the organisms are mutually benefitted.

Sometimes fungi also live in close association with the roots of gymnosperms and angiosperms. This association between fungal hyphae and root of higher plants is known as **mycorrhiza** and the associated fungi are called mycorrhizal fungi.

Some fungi may grow epiphytically on the surface of higher plant parts without causing any major harm. These are called **epiphytic fungi**.

Thank You