

# **Chap 8 (Kingdom Fungi) F.Sc 1st Year Biology**

## **Notes**

### **Chapter 8: Kingdom Fungi**

#### **(Short Questions Answers)**

Name some edible fungi.

About 200 species of mushrooms (e.g., *Agaricus* sp), morels (e.g., *Morchella esculenta*), truffles (underground fruiting bodies of some Ascomycetes, eg: *Tuber* sp) are common edible fungi.

What is the function of constricting ring?

Some species of *Arthrobotrys* trap soil nematodes by forming a constricting ring, their hyphae invading and digesting the unlucky victim.

### **What is economic importance of fungi?**

- Certain fungi are edible e.g., mushrooms (e.g., *Agaricus* sp), morels (e.g., *Morchella esculenta*), truffles
- Certain fungi are used in food industry e.g., yeasts (*Saccharomyces cerevisiae*).
- Some fungi are source of antibiotics and some other drugs e.g., Penicillin is obtained from *Penicillium notatum*
- Some natural dyes obtained from lichens are used in textile industry.
- Yeasts are heavily used in genetic/molecular biological research because of their rapid generation and rapidly increasing pool of genetic and biochemical information.
- Fungi are responsible for many serious plant and animal diseases.
- Saprobic fungi cause incalculable damage to food, wood, fibre, and leather by decomposing them.

### **Differentiate between fragmentation and budding.**

Fragmentation is simple breaking of mycelium of some fungal hyphae. Each broken fragment gives rise to a new mycelium. The budding is an asymmetric division in which tiny outgrowth or bud is produced which may separate and grow as a separate individual.

### **What is reindeer moss?**

Reindeer moss is a lichen that is used as food for reindeers and some other large animals in arctic/subarctic/boreal regions.

### **Where fungi are used in food industry? Give two examples**

Certain fungi are used in food industry e.g.

- Yeasts (*Saccharomyces cerevisiae*) are used in the production of bread and liquor
- *Penicillium* species are used for giving flavour, aroma (smell) and characteristic colour to some cheese.

### **What is the importance of *Aspergillus* in food industry?**

Some species of *Aspergillus* are used for fermenting/producing soy sauce and soy paste from soybean: Citric acid is also obtained from some species *Aspergillus* species.

**Name 5 antibiotics (drugs) obtained from fungi.**

Penicillin, Lovastatin, Cyclosporine, Ergotamine and Griseofulvin.

**What are ringworm and athlete's foot?**

Ringworm and athlete's foot are superficial fungal infections caused by certain imperfect fungi.

**What is Candidiasis or candidosis?**

*Candida albicans*, a yeast, causes oral and vaginal thrush i.e., candidiasis or candidosis.

**What is histoplasmosis?**

Histoplasmosis is a serious infection of lungs caused by inhaling spores of a fungus which is common in soil contaminated with bird's faeces if infection spreads into blood stream and then to other organs (which is very occasional), it can be serious and even fatal.

**What is aspergillosis?**

*Aspergillus fumigatus* causes aspergillosis, but only in persons with defective immune system such as AIDS, and may cause death.

**Why any moldy human food or animal forage product should be discarded.**

Some strains of *Aspergillus flavus* produce one of the most carcinogenic (cancer-causing) mycotoxins (toxins produced by fungi) called aflatoxins. *Aspergillus* contaminates improperly stored grains such as peanuts and corn etc. Milk, eggs and meat may also have small traces of aflatoxins. Therefore any moldy human food or animal, forage (feed, hunt) product should be discarded.

**What are dikaryotic hyphae?**

These are septate hyphae which have two nuclei per cell.

**Discuss sexual reproduction in *Rhizopus* or How does sexual reproduction occur in zygomycota?**

During their sexual reproduction, zygote formed directly by the fusion of hyphae. Zygote forms temporary, dormant, thick walled resistant structure called zygospore, hence the name Zygomycetes. Meiosis takes place when zygospore germinates and haploid spores are produced. Spores on germination produce new mycelium.

### **Name sexual and asexual spores of Ascomycetes.**

Mostly Ascomycetes reproduce asexually by budding and sexually by forming asci/ascospores.

### **Write two land adaptations in fungi.**

- Extensive system of fast-spreading hyphae penetrate the substrate and enormously increase the contact and surface area for absorption.
- Hyphae may be modified in such a way as to enable them to reproduce themselves without depending on external water.
- They show very efficient dispersal of spores and conidia by wind, even to very long distances.

### **Give ecological importance of fungi or Give any two points of importance of fungi.**

- They are very important as decomposers and symbionts. Fungi, along with saprobic bacteria, play important role in the recycling of inorganic nutrients in the ecosystem.
- Mycorrhizal fungi improve the growth of plants with which they are associated. 95% of all kinds of vascular plants have this association.
- Lichens growing on rocks break them, setting stage for other organisms during the course of ecological succession.
- Lichens are very good bio-indicators of air quality as they are very sensitive to pollution.
- Some fungi are also used for bioremediation (degrading / removing environmental poisons / pollutants by organisms).

### **What do you know about multicellular reducers?**

Fungi are known as multicellular reducers / decomposers. They play important role in the recycling of inorganic nutrients. (C, N, P, O, H, etc.) in the ecosystem. Fungi are the principal decomposers of cellulose and lignin, the main components of plant cell walls.

**What is ergotism? How it is caused? or Give the cause and symptoms of ergotism.**

Ergotism is a disease caused by eating bread made from purple ergot contaminated rye flour. The poisonous material in the ergot causes nervous spasm (tremor, contraction), convulsion (fit, spasm), Psychotic delusion (illusion) and even gangrene.

**What types of damages are caused by saprobic fungi?**

Saprobic fungi cause incalculable damage to food, wood, fibre, and leather by decomposing them. 15-50% of world's fruit is lost each year due to fungal attack. Wood-rotting fungi destroy not only living trees but also structural timber. Bracket/shelf fungi cause lot of damage to stored cut lumber as well as stands of timber of living trees.

**What is the importance of mycorrhizae for plants?**

The fungal hyphae dramatically increase the amount of soil contact and total surface area for absorption and help in the direct absorption of phosphorus, zinc, copper and other nutrients from the soil into the roots. Such plants show better growth than those without this association.

**What is budding?**

It is the type of asexual reproduction in which an out growth called bud is formed which may be internal or external. On maturation it may become separated from the main body and can become a new individual

**What is fungus?**

Fungi are heterotrophs which are composed of thread like structures called hyphae. Their cell walls have chitin instead of cellulose. They also lack centrioles.

**Give features of Zygomycota.**

- During their sexual reproduction, zygote formed directly by the fusion of hyphae, forms temporary, dormant, thick walled resistant structure called zygosporangium, hence the name Zygomycetes.
- Meiosis takes place when zygosporangium germinates and haploid spores are produced
- Spores on germination produce new mycelium. Asexual reproduction by spores is common
- Hyphae are coenocytic

**Give a description of conidia of Penicillium.**

- They are non-motile, asexual spores which are formed at the tips of modified hyphae called conidiophores.
- They are not found inside the sporangia, but usually in the form of chains or clusters.
- These may be produced in a very large number.
- They can survive for weeks.
- They cause rapid colonization of new food.

**Compare ascus with basidium or Differentiate between ascus and basidium.**

Ascus is a sac like structure of Ascomycetes in which haploid sexual spores called ascospores are formed by meiosis while basidium is a club shaped structure of Basidiomycetes on which are borne basidiospores.

**What is nuclear mitosis?**

During nuclear mitosis, nuclear envelope does not break instead the mitotic spindle forms within the nucleus and the nuclear membrane constricts between the two clusters of daughter chromosomes.

**What is Armillaria?**

A circular clone of Armillaria, growing out from a central focus, has been measured up to 15 hectares (1 hectare = 10000 m<sup>2</sup>). Armillaria is a pathogenic fungus afflicting conifers.

**How spores are different from conidia?**

Conidia are non-motile, asexual spores which are formed at the tips of modified hyphae called conidiophores. They are not found inside the sporangia, but usually in the form

of chains or clusters While spores are haploid, non-motile and produced in very large number within sporangia.

**Write two benefits of each of algae and fungi.**

- Some algae such as keeps are edible and may be used to overcome shortage of food in the world
- Marine algae are also source of many useful substance like algin, agar, carrageenan, and antiseptics.

**Fungi:** Some fungi are source of antibiotics and some other drugs e.g., penicillin and Certain fungi are used in food industry e.g., yeasts (*Saccharomyces cerevisiae*) are used in the production of bread and liquor.

**Give two points of medicinal importance of fungi.**

- **Penicillin**, first antibiotic to be ever discovered (by A. Fleming-1928) is obtained from a fungus, *Penicillium notatum*.
- **Lovastatin**, obtained from fungi, is used for lowering blood cholesterol.
- **Cyclosporine** obtained from a soil fungus is used in organ transplantation for preventing transplant rejection.

**What are bracket or shelf fungi? Give its importance.**

Bracket / Shelf Fungi are club fungi (Basidiomycetes). Club-shaped sexual reproductive structure is known as basidium. Four haploid sexual spores, called the basidiospores, are borne on (not inside) each basidium. Puccinia species are most common rust fungi, and Ustilago species most common smut fungi. Many mushrooms are edible.

**Write structural characteristics of Penicillium?**

*Penicillium* sp. (blue, green molds) are wide spread saprotrophic species common on decaying fruit, bread etc. Its hyphae are septate. *Penicillium* reproduces asexually by means of naked spores called conidia. Conidia are found in chains at the tips of special hyphae called conidiophores, which are branched. Brush-like arrangement of its conidia is characteristic of *Penicillium*. These conidia give colour to the mycelial colony, which is circular.

**Differentiate between conidiophores and coenocytic hyphae.**

Conidia are non-motile, asexual spores which are formed at the tips of modified hyphae called conidiophores. Coenocytic or non-septate hyphae lack septa and are not divided into individual cells. These are in the form of an elongated multinucleated large cell.

### **What is economic importance of yeasts?**

Some fungi are source of antibiotics and some other drugs e.g., Penicillin is obtained from *Penicillium notatum*. Yeasts are heavily used in genetic/molecular biological research because of their rapid generation and rapidly increasing pool of genetic and biochemical information.