KINDGOM - MYCOTA

FUNGI

Mycology	- Study of fungi
Father of Mycology	- Mitcheli → book; Nova platarum genera
Father of modern mycology	- De Bary
Father of Indian mycology	- B.B. Mundker / E.J. Butler
Fungi name given by	- Gaspard Bauhin

EUMYCOTHINA OR TRUE FUNGI

(1) Fungi are found mostly in humus rich soil. But in the presence of moisture, these can grow on leather, wood, pickle and bread. Some fungi live parasitically in plats, animals and human body.

(2) Chloroplast is absent in fungi, so fungi are heterotrophs. Fungi obtain their own food from dead organic matter or living organisms.

On the basis of source of food fungi are of two types

(a) Saprophytic : These fungi obtain their own food from dead organic matter such as bread, rottening fruit, vegetable and dung.

- Nutrition is absorptive type in saprophytic fungi

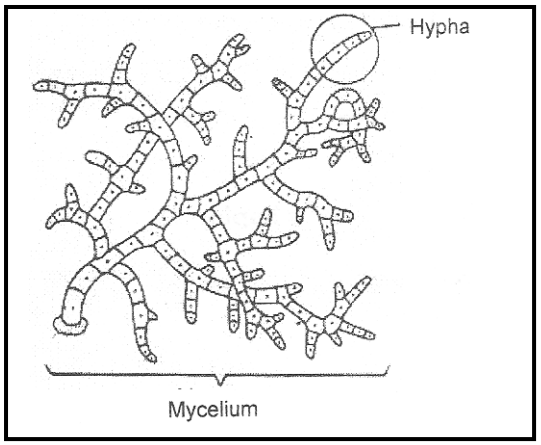
(b) **Parasitic :** These obtain their own food from living organism such as plants, animals and human beings.

- They obtain nutrition with the help of haustoria.

(3) Some fungi are found symbiotically associated with algae and form **lichens.** Some fungi are found symbiotically in the roots of higher plants and form **mycorrhiza.**

(4) The body of fungi is called mycelium. Mycelium is composed of filaments called hypha.
(Hypha - plural → **Hyphae)**

(5) Cell was is present around fungi, which is made up of **chitin** or fungal cellulose. Some quantity of proteins, lipids & cellulose also present with chitin.



Note: (1) Cell wall of the members of class-oomycetes is mainly made up of **cellulose.**
(2) In fungi the stored food remains in the form of **glycogen and oil.**

Heterothallic and Homothallic Species :

Heterothallic species :

Those species in which fertilization takes place between two genetically different gametes are called as heterothallic species. And this phenomenon is known as heterothallism. In heteropthallic condition, the fertilizing gametes are formed on different thallus (mycelium).

eg. Mucor, Rhizopus, Puccinia & Mostly fungi

Homothallic species :

Those species in which fertilization takes place between two genetically similar gametes are called as homothallic species. And this phenomenon is known as Homothallism. In Homothallic condition, the fertilizing gametes are formed on same thallus.

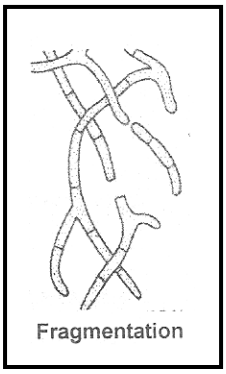
eg. Chaetomium

REPRODUCTION

In fungi, reproduction is of three types

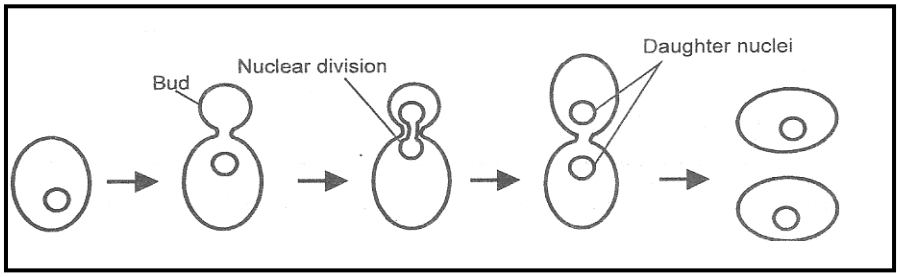
(1) Vegetative reproduction :

(A) Fragmentation : Some times the fungal filament (mycelium) breaks into small pieces due to any filament and starts working like normal filament.



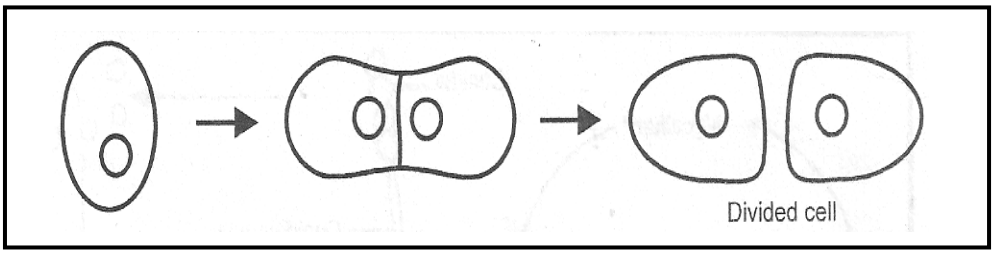
(B) Budding : Some times a bud like proteuberance is formed in non-mycelial fungues. Now this bud, separates from the mother fungi and functions as young fungi. At the time of separation of bud from its mother cell or fungi, the nucleus of mother cell divided mitotically **(or amitotically - in yeast)** into two parts. Out of these two nuclei, one remains with in the mother cell while the other migrates to the bud.

eg. : ***Saccharomyces (Yeast)***



(C) Fission : Some times the fungal cell divides into two parts. Its nucleus also divides in to two parts. Now the nuclei go to both cells and each cell starts working as a new cell.

eg. ***Schizosaccharomyces (Yeast)***



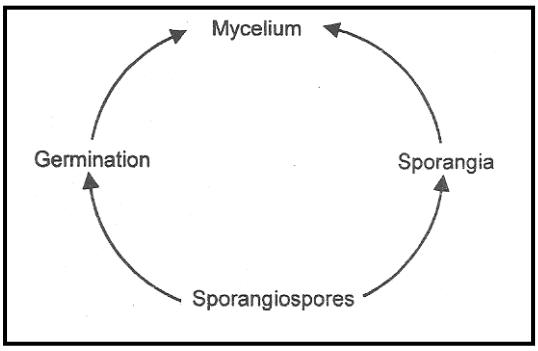
Note : Reproduction through bud formation and fission takes place only in nonmycelial form.

(2) Asexual reproduction -

Asexual reproduction takes place by the formation of different types of spores. These spores are formed by **mitotic division.**

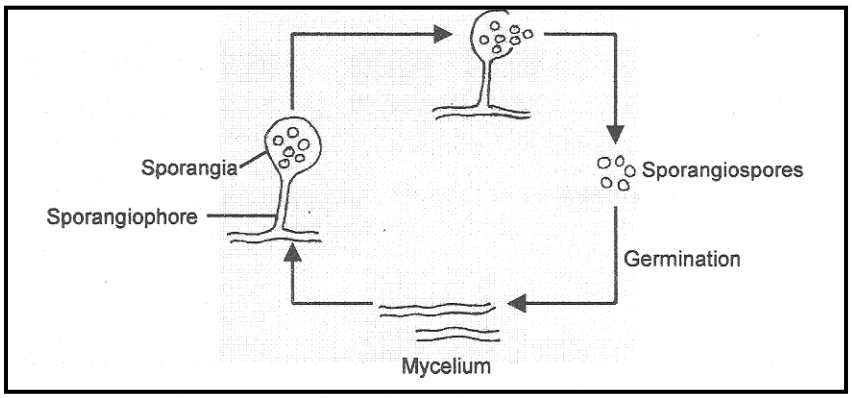
Spores are the following types

(A) Sporangiospores - They are formed in sporangia, Sporangia is formed at the tip of gungal filament. Thos fungal filaments on which sporangia are formed is called as sporangiophore. Numerous spores (sporangiospores) are present in the sporangia, that comes out by rupturing of sporangia and germinate to forms fungal filaments. The formation of sporangiospores takes place **endogenously.**



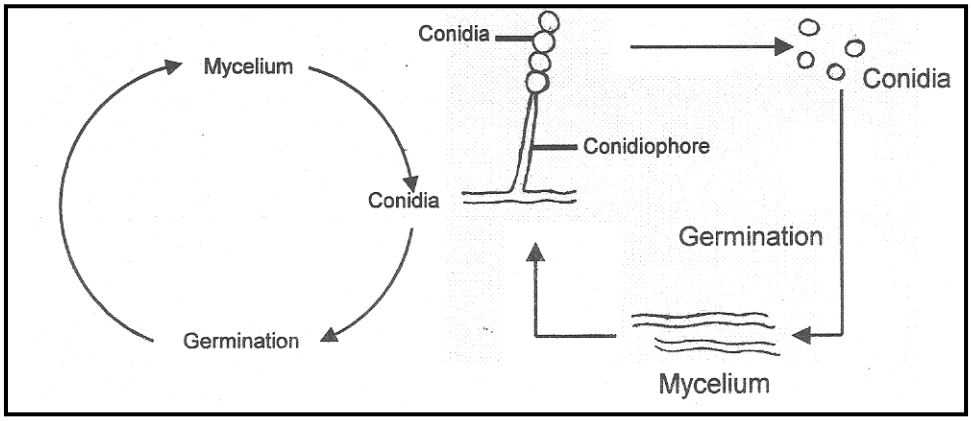
Sporangiospores are of Two types

- **Zoospore :** When the sporangiospores formed in sporangia are flagellated and motile, then they are called as zoospores. In this condition the sporangia are called as zoosporangia.
- **Aplanospore :** When sporangiospores re non flagellated and non motile then they are called aplanospores.

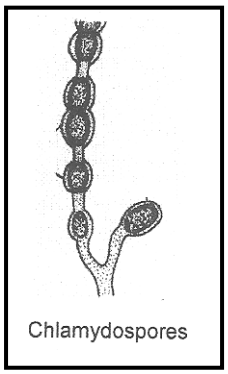


(B) Conidia : The formation of conidia takes place **exogenously.** These conidia are formed at the tip of conidiophores.

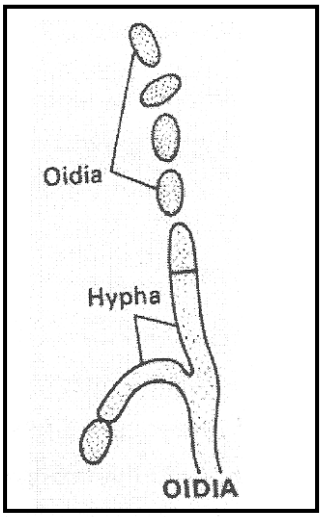
- **Conidiopore -** Straight fungal filament on which conidia are formed are called conidiophore. Conidiophore may be unbranched, branched, septate or aseptate.
- **Conidia -** Conidia are formed single or in chain. Each conidia formes fungal filament (mycelium) by germination.



(C) Chalmydospores : They are formed in adverse condition.



(D) Oidia : Sometimes in plenty of food, the cells of fungal hyphae gets seperated and stars working like spores. Now these cells are called oidia.



(3) Sexual Reproduction :

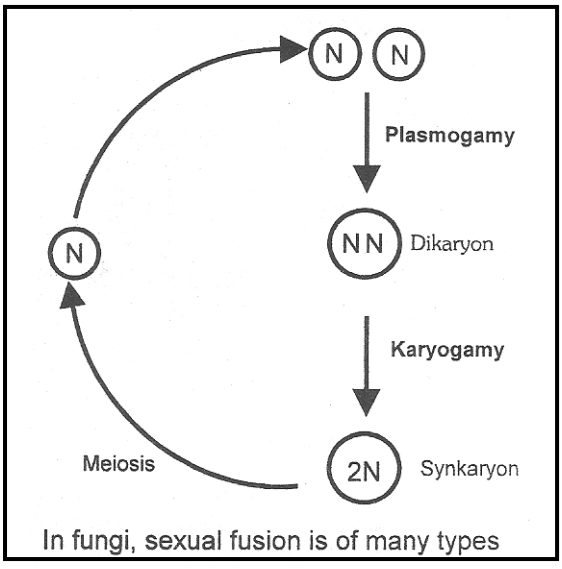
The structure in which gametes are formed are called gametangia.

Sexual reproduction in fungi completes in three steps

(A) Plasmogamy : This is the first stage of sexual reproduction. In this stage two sex cells fuse with each other but their nuclei do not fuse, due to which a single cell has two nuclei. This binucleate or dikaryon stage is called **dikaryon**

(B) Karyogmy : In this stage the nuclei present in the cell fuse with each other, to form a diploid nucleus which is known as **synkryon.**

(C) Meiosis : In this stage, meiosis takes place in the diploid nucleus due to which again haploid nuclei or haploid cells are formed.



In fungi, sexual fusion is of many types

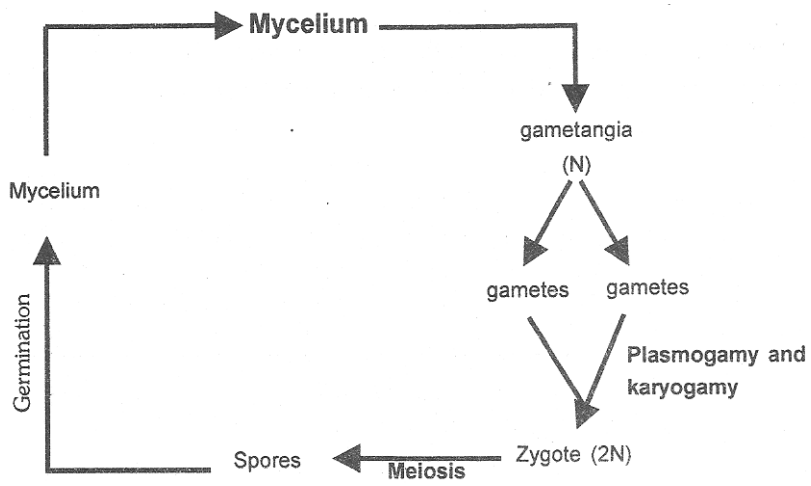
MEHODS OF SEXUAL REPRODUCTION

(1) Planogametic Copulation :

(a) In this process whole mycelium (vegetative cell) starts working as a sex cell i.e. whole cell starts working as gametangia. Each nucleus of gametangia behaves like gametes.

(b) After that the gametangia ruptured and its nuclei (gametes) become free.

(c) Now these gametes fuse with each other to form zygote. Now meiotic division takes place in **zygote**. As a result of which haploid spores are formed. Now each spores germinates and gives rise to a new mycelium.

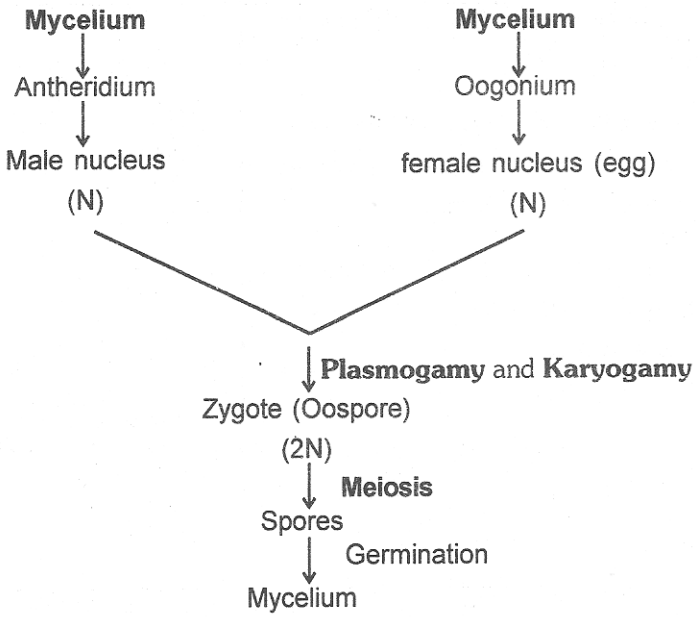


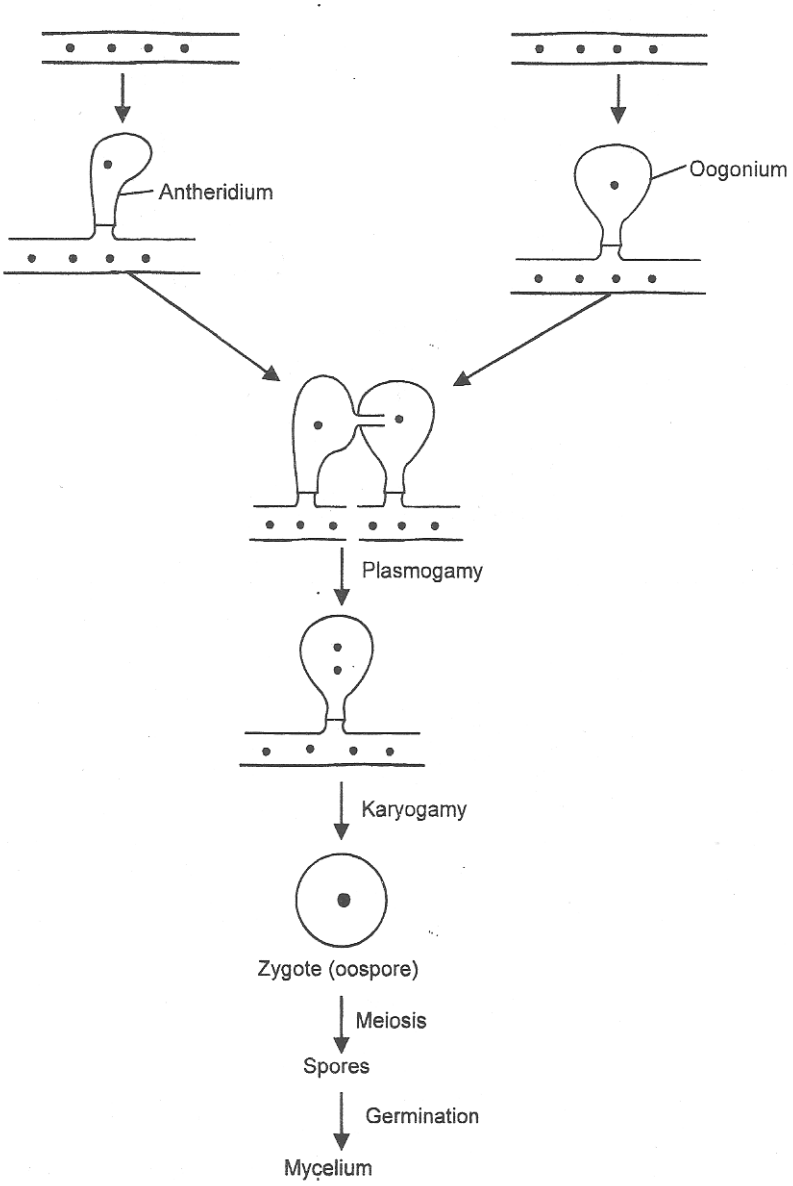
(2) Gametangial Contact :

(a) In this process, first of all male and female sex organs are formed on two different mycelium. Male sex organ is called antheridium and female sex organ is called oogonium.

(b) Both antheridium & oogonium have one nucleus. Now antheridium and oogonium come close to each other. After that a fertilizing tube comes out from antheridium and enters the oogonium. After that, the nucleus of antheridum goes to the oogonium through this tube and fuse with its nucleus. As result of which a diploid zygote is formed, which is called **oospore.**

(c) Now meiotic division takes place in the nucleus oospore, as a result of which haploid spores are formed. Now each spore germinates and gives rise to a new mycelium.

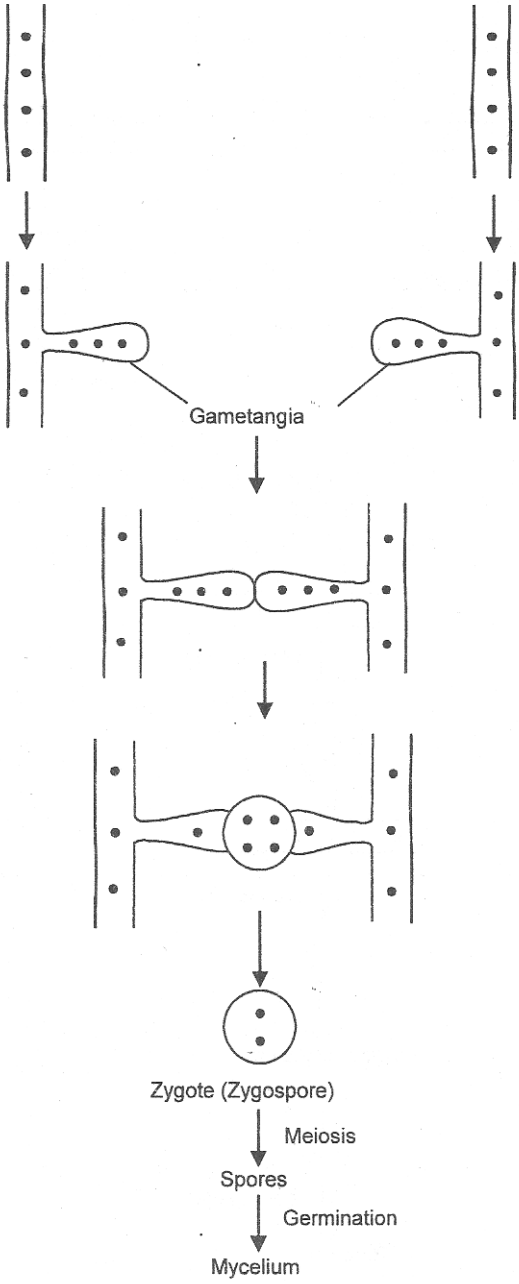




(3) Gametangial copulation :

(a) In this process, gametangia are formed on two different mycelium.
First of all the apical part of mycellum become swollen and form gametangia. Both the gametangia have many nuclei. Now these gametangia come close and fuses with each other. Due to which a zygote is formed which is known as **zygospore.**

(b) Now meiotic division takes place in zygospore, as a result of which haploid spores are formed. Now each spore germinates and gives rise to a mycelium.



(4) Spermatization :

In this process spermatia or phycniospores are formed.

(5) Somatogamy :

In it, no sex organs are formed. In this process two mycelium comes close to each other and fuse.

True fungi are divided into following classes on the basis of structure of mycelium & sexual reproduction –

(A) PHYCOMYCETES **(B) ASCOMYCETES**

(C) BASIDIOMYCETES **(D) DEUTEROMYCETES**