PHYCOMYCETES

All the fungi included in this class are called as lower fungi

Mycelium :

The fungal filament (mycelium) of all the fungus included in this class are coenocytic and aseptate. This type of filament is known a **acellular coenocytic.**

Alexopolus was a mycologist did not consider Phycomycetes as class. He dissolved phycomycetes into four different classes.

(a) chytridiomycetes **(b) Plasmodiophoromycetes**
(c) Oomycetes **(d) Zygomycetes**

Note : The mycelium of these four classes are same in structure i.e. coenocytic & aseptate. But they are dissimilar on the basis of sexual reproduction.

(a) Chytridiomycetes -

Asexual reproduction - By sporangiospore (zoospore & aplanosspore)
Sexual reproduction - By Planogametic copulation

Types of sexual reproduction

- Isogamous - *Synchytrium*
- Anisogamous - *Allomyces*

e.g.

- ***Synchtrium endobioticum -*** This fungi causes "Black heart of Potato" or "Wart of Potato" disease.
- ***Allomyces***

(b) Plasmodiophoromycetes :

Asexual reproduction - By Sporangiosproe (Zoospores)
Sexual reproduction - By Planogametic copulation

Types of Sexual reproduction

- Isogamous - *Plasmodiophora*

eg. ***Plasmodiophora***

(c) Oomycetes :

Asexual reproduction - By the formation of sporangiopores (zoospores) & conidia.
Sexual reproduction - By Gametangial contact

Type of sexual reproduction

- Oogamous - All the members

eg.

(1) ***Phytophthora infestans -*** Causes "late blight of potato". This disease in known as "Famine of Ireland " - 1845.

(2) ***Pythium species -*** Causes "Damping off" disease in tobacco & "vegetable crops"
(3) ***Sclerospora graminicola -*** Causes "Green ear disease" of Bajra. The main Characteristic of this diseases is Phylloidy (Phyllodiy - i.e. all the parts of flower are modified into green leaves).
(4) ***Albugo candida or Cystopus candidus -*** It causes "White rust disease" in the members of cruciferae family.

(d) Zygomycetes :

Asexual reproduction - By the formation of sporangiospores (aplanopores).
Sexual reproduction - By Gametangial copulation

Types of sexual reproduction		
● Isogamous	-	All the members

e.g.

(1)(***Pilobolus :*** It grow s on during since it is dung loving fungi therefore it is called as coprophilous fungi. It Preders to grow on horse dung. It is also called as "Hat thrower" or "fungal shotgun". This name is given on the basis of blasting of sporangium.

Note : ***Coprophilous fungi*** - The fungi which grow on dung are called corprophilous.

(2) ***Rhizopus & Mucur -*** These are known as **bread mold -** They prefer to grow on bread. The tip of mycelium of Rhizopus is black coloured. Therefore this fungus looks black coloured.

ASCOMYCETES

"The sac fungi"

Mycelium :

Uninucleate and septate.
Septa are found in mycelium of ascomycetes. Poresa re present in septa. These pores allow cytoplasm to pass from one cell to other cell. Pores do not allow passing nucleus.

Sexual reproduction :

"Somatogamy"

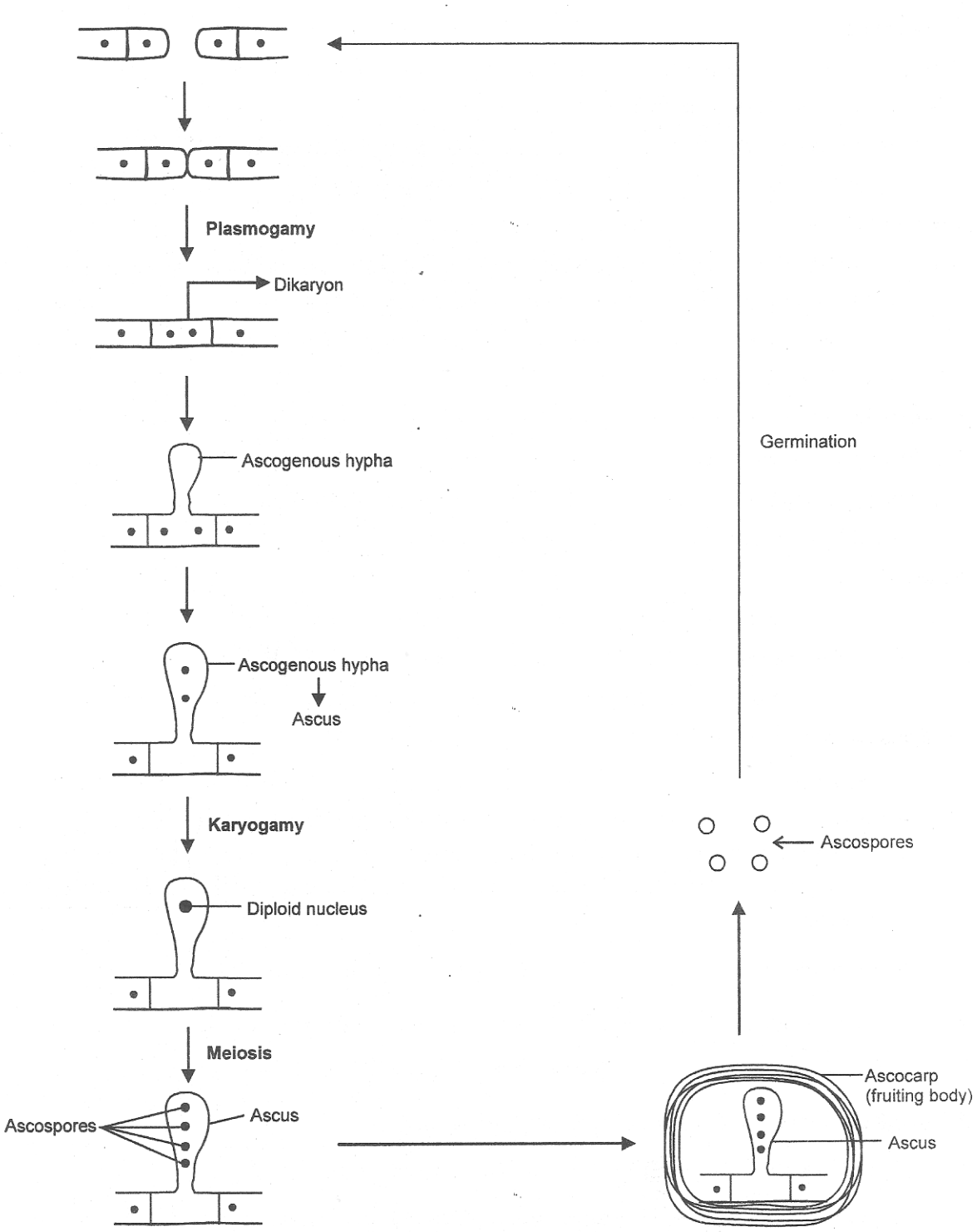
Ascospores are formed during sexual reproduction. On this basis they are named as **Ascomycetes.**

(a) There are three stages in sexual reproduction of Ascomycetes

- **Plasmogamy**
- **Karyogamy**
- **Meiosis.**

(b) In tis two different mycelium come close to each other and fuse to form **dikaryon.**
(c) After this an outgrowth originates from dikryon which is called ascogenous hypha. Ascogenous hypha develops and form as sac like structure which is called **ascus** (Plural - Asci). Due to this sac like ascus, ascomycetes are called as **sac fungi.**

(d) Now both the nuclei reach in ascus and fuse. As a result diploid nucleus is formed. Now meiosis takes place in the nucleus of Ascus, as a result of which haploid spores are formed which as called **ascospores.**
Note : Minimum four ascospores are formed in one ascus but generally 8 ascopores are formed in one Ascus.



(e) After the formation of ascospores, the mycelium grows around the ascus and forms a covering which is called as **fruiting body** or **ascocarp.**

- 1 to 5 ascus are present in one ascocarp.
- 4 or 8 ascospores are present in one ascus.

(f) By the rupturing of ascocarp & ascus, ascospores become free and each ascospore forms a new mycelium.

Three types of fruiting bodies are present in ascomycetes

A. Cleistothecium :

This is a closed and spherical fruiting body. There is no way for axcospores to come out. After maturation it ruptures and ascospores become free.

This type o fruiting body is found in the members of subclass - **Plectomycetes**

eg. of Plectomycetes - *Pencillim, Aspergillu,s Erysiphe*

B. Perithecium :

This fruiting body is flask like. Pore is present (ostiole) of the apical part of this fruiting body for the elimination of ascospores. On the rupturing of ascus, these ascopores come out of the pore.

This type of fruiting body is found in the membres of sub - class **– Pyrenomycetes**

eg. of Pyrenomycetes - *Neurospora, Claviceps*

C. Apothecium :

This fruiting body is like open disc.

This type of fruiting body is found in the members of sub class **Discomycetes**

eg. of *Discomycetes - Peziza, Morchella*

Note :

- The fruiting body of ***Morchella*** is edible, because it is delicious.
- The classification of class-ascomycetes is based on fruiting body.
- Ascus are naked in ***Yeast*** because fruiting body is absent in it.

(1) Penicillium : Blue or Green mold.

- ***P. notatum -*** A Flemming obtained the antibiotic penicillin from it. Penicillin is the first discovered antibiotic. A Flemming was awarded Nobel Prize for it. But now a days more quantity o Penicillin is obtained from *P. chrysogenum.* A flemming was doctor in British army and while working on bacterium *Staphylococcus,* he by chance discovered the penicillin. Discovery of Penicillin was serendipity i.e. by change discovery.

- **P.griseofulvum -** *"*Griseofulvin*"* an antifungla antibiotic is obtained from it.

- **P *camemberti & P. roquiforti*** - Both are used in the manufacturing of camembert cheese and requefort cheese respeictlvly. Cheese is made by fermentation which is done by fungus.

(2) Aspergillus : Black or Brown mold of Blacky - smoky mold

- ***A.proliferans -*** An antibioic 'Proliferin' is obtained from it.

- ***A. fumigatus -*** It causes many diseases in humans & cattles. These disease are known as "aspergillosis"

  eg. Aspergillosis of ear - Min cause of ear pain.
  Aspergillosis of lungs - Its symptoms are similar to T.B.

- **A flavus -** It prefer to grow on stored food (groundnut, cashew nuts etc.) and fodder. It secrets toxic subtances. These toxic substances are known as aflatoxins.
  Aflatoxins - They are carcinogenic i.e. they develop cancer. Aflatoxin causes live cancer.

- **A. niger -** Weed of laboratory

(3) Claviceps :

- ***Claviceps purpurea* -** It causes "Ergot disease" of Bajra.
- "Ergotin" (drug) is obtained from it.
- A narcotic drug (LSD) is obtained from it LSD (Lysergic aid diethylamide) is hallucinogenic drug.

(4) Morchella :- The species of Morchella are commonly called as morels. It is an edible fungus.

(5) Neurospora :- Red Pink mold → "Drosophla of plant Kingdom". It is used for the study of genetics in Plant kingdom.

Beadle and **Tatum** proposed "One gene-one enzyme theory in Genetics by experimenting on Neurospora. They were awarded Nobel prize for it.

(6) Erysiphe :- Different species of Erysiphe causes "powrdery mildew" diseases on plants.

- ***E. tritici* -** It causes powrdery mildew of wheat.
- ***E. polygone* -** It causes powdery mildew of pea.

(7) Peziza :- It is called as **cup fungi.**

(8) Trichophyton & Microsporum :- It produces "Ringworm" in humans e.g. - eczema, itching.

- ***Trichophyton interdigitale*** and ***Tania pedis***- It causes "Athelete foot disease" in humans. It is also called as "Ring worm of foot".

(9) Yeasts

YEAST

Yeast is an **unicellular fungi** - According to five kingdom classification, it should be placed in Protista. But exceptionally it is placed in Mycota (fungi) because its life cycle is similar to class-Ascomycetes. Yeast grows on ripened fruits like grapes, sugarcane, date palm and flowers. Mycelium is absent in yeast. It yeast is dissolved in sugar solution then **pseudomycelium** is formed. Because in sugar solution, it grows very fast i.e. it reproduces fast.

Saccharomyces
Schizosaccharomyes } Yeasts

In Yeast three types of life cycle are found

(A) Haplontic life cycle - Present in most of genera.
e.g. - *Schizosaccharomyces octosporus*

(B) Diplontic life cycle-
e.g. *Saccharomyces ludwiggi*

(C) Haplo-diplotic life cycle -
e.g. - *Saccharomyces cerevisiae*

Pedogamy :- Sexual reproduction by young ones. In yeast some times a bud many fuse with it's mother cell as perform sexual reproduction.

Adelphogamy :- Sexual reproduction between sisters. In yeast some times two daughter buds produced from the same mother cell may fuse to perform the sexual reproduction.