

S. Division: - Myxomycotina  
Class Myxomycetes

It is an interesting group of organism of great scientific interest. They exist in non green slimy masses sending out pseudopodia. This has earned for them the name slime molds or "slime fungi". There are about 450 sps of slime molds reported from all over the world. All of them have been placed in a single class - Myxomycetes in the sub-division Myxomycotina.

Characteristics of class Myxomycetes:

The class Myxomycetes include the plasmodial slim molds most of which produces pigmented spores in small delicate sporangia. Characteristic of the class is given below:-

- ① The somatic phase is represented by a free living unit multinucleate, naked, acellular diploid protoplasmic mass called the plasmodium.
- ② The entire plasmodium is used up in the formation of fructifications called sporangia.
- ③ The spores are differentiated by meiosis from the diploid protoplast of the sporangium.
- ④ The spore wall is differentiated into two layers, the outer of which is sculptured or spiny.
- ⑤ The sporangium generally contains an intricate network of fine threads known as capillitium (Capillitium).
- ⑥ The spores germinate to give rise to biflagellate swarm cells which functions as gametes.
- ⑦ The sexual reproduction is of isogamous type.
- ⑧ The diploid zygote directly gives rise to the multinucleate plasmodium.

The class Myxomycetes include six orders

- ① Ceratiomyxales
- ② Liceals
- ③ Trichiales
- ④ Echinosteliales
- ⑤ Stegomyxales
- ⑥ Physarales.

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"Sub-Division - Eumycotina"  
The lower fungi "Phycomycetes"

General features - The lower fungi (Phycomycetes) includes the simplest members of true fungi and represented by about 1500 Sps. Majority of these are aquatic (Saprolegnia), some are amphibious (Phytophthora) and some terrestrial (Rhizopus). They live either as strict parasite or saprophytes. Strictly parasitic sps live on algae, ferns and seed plant. A number of them causes diseases of economic plant such as downy mildew of grapes.

Phycomycetes are characterised by:

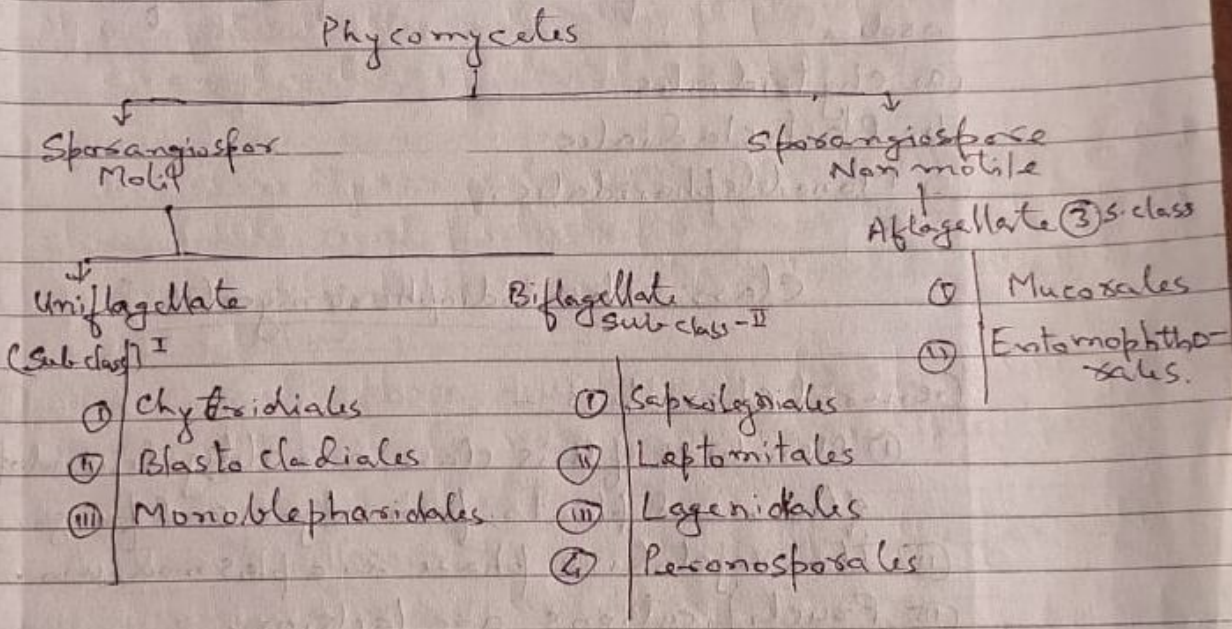
- (i) The aquatic somatic phase consists of either a unicellular thallus or a non-septate, coenocytic mycelium. The septa usually remain suppressed in the actively growing stage.
- (ii) Asexual reproduction take place by sporangiospores and sometimes by conidia. The sporangiospores are motile (Zoospores) in aquatic species and non-motile in the terrestrial sps.
- (iii) The spore producing units are usually not grouped into a complex fructification.
- (iv) Sexual reproduction, when present, is either isogamous or heterogamous.
- (v) Karyogamy generally follows plasmogamy almost immediately so that there is no dikaryophase in the life cycle.

The common e.g. of lower fungi are the black molds, water molds, downy mildews and white rusts.

"Classification of Lower Fungi"

Phycomycetes is not a natural group of closely related forms. Sparrow (1958-59) suggested that the order Plasmodiophorales which include

the endoparasitic slime molds be given the rank of a class Plasmodiophoromycetes as coordinate with the other four classes of fungi. The rest of the Phycomycetes be classified, on the basis of presence or absence of motile cells in the life cycle and the kind of number and arrangement of flagella on the motile cells as given below



Alexopoulos, took a more logical step to split the Phycomycetes directly into six classes namely

- (i) Chytridiomycetes
- (ii) Hyphochytridia
- (iii) Hyphochytridiomycetes
- (iv) Oomycetes
- (v) Plasmodiophoromycetes
- (vi) Zygomycetes
- (vii) Trichomycetes.

class:- chytridiomycetes

General character:-

- (i) Production of uniflagellate reproductive cells
- (ii) Flagellum is of a whiplash type
- (iii) Flagellum is posteriorly attached.

- ④ The vegetative body is a unicellular, holocarpic thallus.
- ⑤ The asexual reproductive organ are the Sporangia, each of which produces numerous, tiny uninucleate and uniflagellate zoospores.
- ⑥ The sexual reproduction may be isogamous or anisogamous.

It is further classified in following order

- (a) Chytridiales
- (b) Blastocladales
- (c) Monoblepharidales.

### Class: - Plasmodiophoromycetes

General characters: -

- (i) Members of this class are obligate endoparasites of the seed plants, fern, algae and fungi.
- (ii) The vegetative phase is a plasmodium.
- (iii) Fruetifications are lacking.
- (iv) The swarm cells are biflagellate.
- (v) The two unequal flagella are inserted anteriorly.
- (vi) Sexual reproduction is isogamous.

This class has a single order named as Plasmodiophorales.

### class: - Oomycetes

General characters: -

- (i) The members of this class are characterized as a rule by oogamous reproduction.
- (ii) The gametes are non flagellated.
- (iii) The zoospores are biflagellate.
- (iv) They may be pyriform or reniform in shape.
- (v) One of the flagella is of tinsel type and the other of whiplash type.

- (VI) Both type of zoospores lacks cell walls.
- (VII) The mycelium is extensive and coenocytic.
- (VIII) The septa remain suppressed in the actively growing hyphae but the reproductive organs are separated by a basal septum.
- (IX) The hyphale wall generally consists of cellulose and not chitin
- (X) The ~~are~~ representative of this group exhibit progressive evolution from the aquatic to the land habitat.
- (XI) Advanced land forms are obligate parasites which produce wind dissemminated asexual reproductive bodies called the Sporangia.
- (XII) The Sporangia are deciduous. The detached Sporangia usually do not produces zoospore instead they behave like conidia, directly germinating to a new mycelium. Some times ~~the~~ detached Sporangia behave like a zoosporangium and produces zoospores.

Classification of oomycetes (class)

Sparrow (1960) divided Oomycetes into four orders in this class:

- (i) Saprolegniales,
- (ii) Leptomitales.
- (iii) ~~Leptomitales~~ Lagerhemiales
- (iv) Peronosporales

Out of above four orders, Saprolegniales and Peronosporales are of importance to man because certain members of these orders parasitize plants of economic importance - e.g. Pythium, Phytophthora etc.

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## "class - Zygomycetes"

### General characteristics:-

- ① This class is represented by about 350 species, which are grouped under 7 genera.
- ② They all are terrestrial molds which show a wide range in their habitats.
- ③ Mostly they are Saprobes Saprobes. But some are parasit (facultative) e.g. *Rhizopus sexualis*, of higher plants.
- ④ The mycelium is well developed.
- ⑤ Cell walls chiefly composed of fungus chitin.
- ⑥ Absence of motile cells in the life cycle.
- ⑦ Asexual reproduction usually by means of non-motile, spore spores produced in large number within sporangia, sometimes entire sporangium functions as a single spore as conidia do.
- ⑧ Frequent occurrence of chlamydospores.
- ⑨ Sexual reproduction by means of gametangial copulation.
- ⑩ The formation of a sexually produced, resting spore called the zygospore, resulting from complete fusion of the protoplasts of two gametangia.
- ⑪ The germination of zygospore to produce a hypha which bears a terminal sporangium.

### Further classification of Zygomycetes

The class zygomycetes includes two orders,

(I) Mucorales - have about 250 sps.

(II) Entomophthorales.

### Economic Importance of Lower fungi:

The saprophytic lower fungi are the frequent contaminants of our food stuffs (*Rhizopus*, *Mucor* etc). They spoil our foods and consumer goods some

of them cause rotting of fruits and vegetables in storage.

Many sps of lower fungi has use of great industrial use. *R. stolonifer* is employed in the preparation of "fumaric acid" while *R. oryzae* is utilized to in the preparation of alcohol.

Some sps of *Rhizopus* such as *R. sinensis*, *R. stolonifer* and *R. nodosus* yield lactic acid. Some of the lower fungi particularly, *Mucorales* are utilised in the production of important chemicals such as oxalic acid, citric acid, and other useful chemicals.

of the parasitic sps "*Synchytrium endobioticum*" causes a serious parasitic disease the "black root disease" of potato tuber. The parasitic sps of order *Peronosporales* are destructive parasites of our crop plants. Some common eg of these these disease are, Potato blight, Downy mildew of grapes, brown rot of lemons, root rot of or damping off of seedlings.

Some of the lower fungi are parasitic on animal including man. Among them certain sps of *Mucor*, *Rhizopus* and *Absidia coenobifera* attack nervous system of man and prove to be fatal.