Lecture 6 Division 2: Eumycota

Class 4: Zygomycetes

General characteristics:-

- 1. Most zygomycetes produce a well- developed mycelium consisting of coenocytic hyphae.
- 2. Producing a thick- wall resting spore called a zygospore that develops within a zygosporangium formed as a result of complete fusion of two equal or unequal gametangia.
- 3. Asexual reproduction by production sporangiospores or aplanospores.
- 4. Most of zygomycetes are saprobes, such as bread-mold, others are parasites such as Fly fungi, and some are obligate parasites in other zygomycetes, or facultative parasites in plants.

Classification of class zygomycetes:

Traditionally, most authors have divided this class into three orders:

- Order 1: Mucorales
- Order 2: Entomophthorales
- Order 3: Zoopagales

Order 1: Mucorales:-

General characteristics:-

1- Most of Mucorales are saprobes, living on decaying plant or animal matter.

2- Some of zygomycetes produce organic acids such as oxalic, lactic, and succinic acids.

3- Few of zygomycetes are parasites such as *Rhizopus stolonifer* in fruits during the storage. Figure 22.



Figure 22: Rhizopus stolonifer

Asexual Reproduction:-

The Mucorales reproduce asexually by aplanospores that are produced in sporangia. The sporangia are borne on simple or branched sporangiophores. Such sporangium is formed at the tip of a sporangiophore as globose swelling into which nuclei and cytoplasm have moved from the somatic hyphae below. The part of sporangiophore within sporangium is called columella. Sporangium contains many thousands of spores. Figure 23.



Figure 23: Mucor type

In this order the sporangia are developed toward decreasing in size and in the number of sporangiospores and in some cases reach to one spore conidium-. We can distingusih two groups:-

Group 1:- Which contains globose form called **sporangiola** as in genus *Thaminidium*, the sporangiophore is branched dichotomously, first branch bearing normal sporangium and the other bearing sporangiola which contains a few numbers of spores between 6-10 and it does not contains columella also it is small in size.

In Choanephora trispora there are three types of sporangia:

- Large multispored sporangium with columella.

- Smaller, few spores sporangium lacking columella.

- Sporangiola with only three spores and there is no columella.

The monosporous sporangiola of some species are extremely difficult to distinguish from true conidia such as in *Cunninghamella*.

Group 2: A number of Mucorales produce their spores in cylindrical sporangiola that we call merosporangia .

Merosporangie may be borne on the surface of an inflated sporangiophore tip and radiate out or they may be formed on sporocladia such as in *Syncephalastrum*. While in kickxellaceae the merosporangia contain only one spore bearing on pseudophialides as in *Kickxella*. Figure 24.





Figure 24: Types of sporangia in order Mucorales

Sexual reproduction:

Sexual reproduction in the Mucorales takes place by the copulation of two multinucleate gametangia that are mainly similar in structure, but that may differ in size. The first step leading to the formation and fusion of these gametangia involves the formation of special hyphae called zygophores. The tips of the two zygophores swell to from progametangia. A septum termed the gametangial septum then forms near the tip of each progametangium, separating it into two cells, a terminal gametangium and a suspensor cell.

The fusion septum then dissolves; plasmogamey and Karyogamey are take place forming prozygosporangium. It enlarges, develops a thick multilayered wall, and becomes the zygosporangium in which single zygospore develops. Figure 25.



Figure 25: Life cycle of Rhizopus stolonifer

Order 2: Entomophthorales: -

Many of these fungi are parasites in insects. The most familiar species is *Entomophthora muscae* commonly called the fly fungus, which is often found on the dead bodies of house flies clinging to long unwashed window panes in attics, garages, and university classrooms. If you examine such a fly you will find a wide, white, halo –like zone on the glass surrounding the dead fly. The white zone consists of spores -conidia- that have been shot off the sporogenous cells growing out of the body of the fly.

The spores, which are produced singly at the tips of unbranched sporogenous cells, are covered by a mucilaginous substance and adhere to any object. If this spore contacts another fly, it quickly germinates and penetrates the cuticle of the body. Infected fly usually die within a week or so after infection and the sporulation process is repeated. Sexual reproduction in Entomophthora takes place when hyphal bodies acting as gametangia, copulate and develop a zygosporangium containing a zygospores.