Mycology

Lec (5)

Kingdom Stramenopila (chromista)

Includes diatoms, chrysophytes, brown algae and phyla of fungal-like organisms:

Phylum 1 Hyphochytriomycota

Phylum 2 Labyrinthulomycota

Phylum 3 Oomycota

Its name was introduced by D. J. Patterson in 1989 based on tinsel-type flagellum. Tinsel flagellum with two rows of tubular tripartite hairs , Pulls zoospore through water and Presence of filamentous thallus in some stramenopiles and Fungi is evidence of convergent evolution .

The individuals of 3 phyla are shared with true fungi in many physiological and morphological characteristics like have cell wall , and somatic phase consist from branched filaments hyphae and their nutrition is Absorption but different from true fungi in forming zoospores and the chemical components of cell wall is cellulose .

On the other hand theses individuals also different from protistae (slime molds) in forming branched hyphae , have cell wall while somatic phase in slime mold (myxoamoeba uninucleate or plasmodium multinucleate) , cell wall less and its nutrition is phagotrophic in slime molds while absorptive nutrition in stramenopila .

Phylum Oomycota (water molds)

Oomycota" means "egg fungi," and refers to the large round **oogonia**, or structures containing the female gametes . has economic importance because

it includes **water molds** (grow on injured tissue but also will grow on the skin and gills of fish) and **downy mildews (**parasitic terrestrial plants acts as a pathogen) .

. They are filamentous which must absorb their food from the surrounding water or soil, or may invade the body of another organism to feed. As such, oomycetes play an important role in the decomposition and recycling of decaying matter. Other parasitic species have caused much human suffering through destruction of crops and fish.

The Oomycota were once classified as fungi, because of their filamentous growth, and because they feed on decaying matter like fungi. The cell wall of oomycetes, however, is not composed of chitin, as in the fungi, but is made up of a mix of **cellulose** and glycan. The nuclei within the filaments are **diploid**, with two sets of genetic information, not haploid as in the fungi.

Characteristic of oomycota

1-have cell walls composed of **cellulose** and glycan , a diploid dominant lifecycle (2n).

2- somatic phase : The mycelium is **coenocytic** and produce septa only to separate the reproductive structures from the assimilative portion of the thallus.

3- Asexual reproduction is by **zoospores** that are produced in **zoosporangia.** The zoospores produced are biflagellated with one flagellum of the whiplash type and the other of the tinsel type.

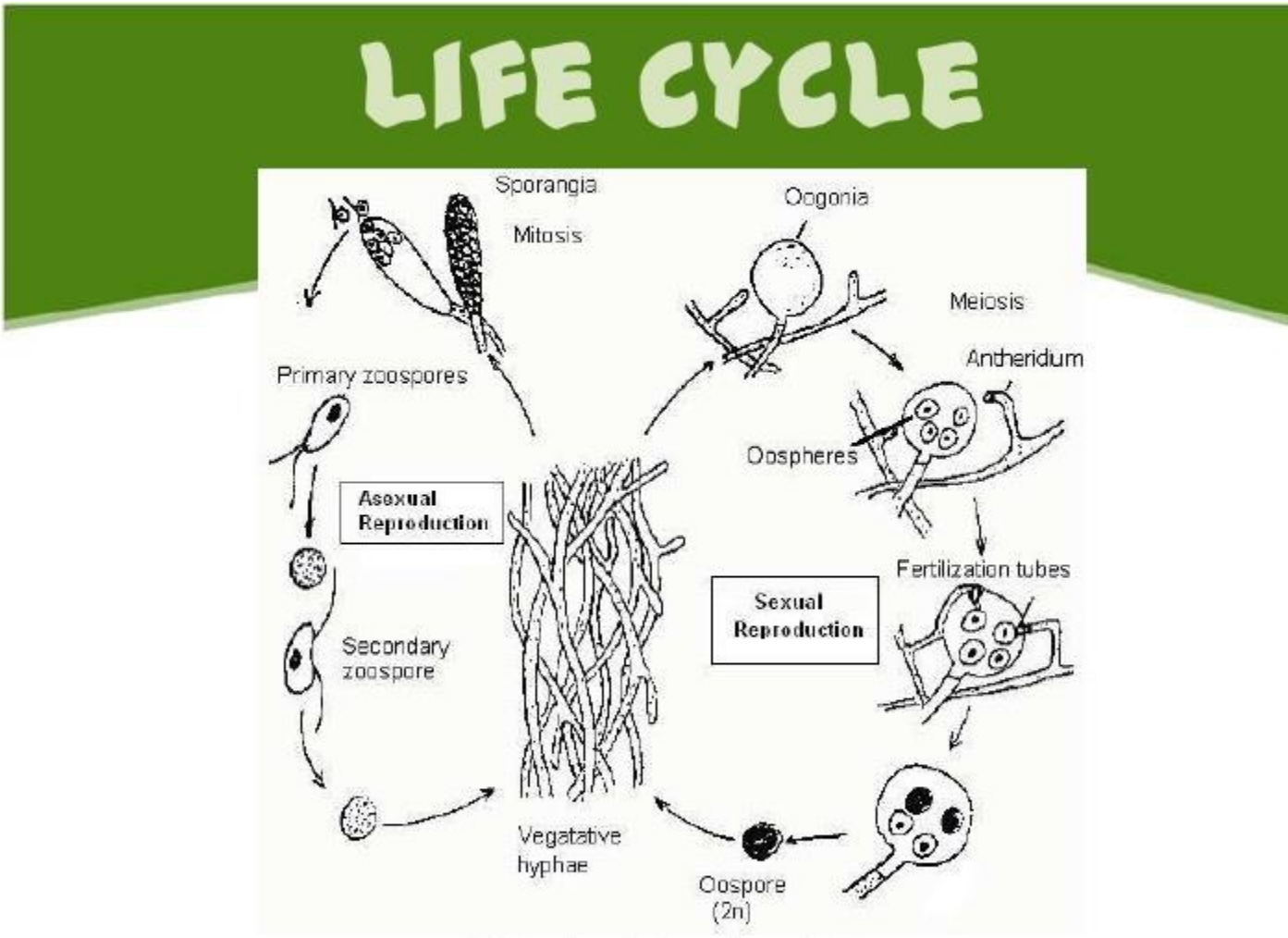
4-Sexual reproduction is **heterogamous** or oogamus and occurs by direct injection of the male nuclei (=sperms) from the **antheridium** into the eggs contained in the oogonium to form zygote that is called oospore which produced by gametangial contact .

Class: **Oomycetes**

The characteristics of the class Oomycetes is the same as those of the phylum. We will examine two representatives in the Oomycota: two orders (Saprolegniales) and (Peronosporales).

Saprolegnials is include the largest family saprolegniaceae : ex: *Saprolegnia parasatica and Achlya* spp.

Saprolegnia is the main genus of water molds responsible for significant fungal infections of freshwater fish and eggs. it likes most water moulds, is both a saprotroph and necrotroph or facultative parasite (fungi kill their hosts and live off the dead tissue.) . Typically feeding on waste from fish or other dead cells, Saprolegnia has a complex life cycle which includes both sexual and asexual reproduction. Sexual reproduction involves the production of antheridium and oogonium gametangia, which unite for fertilization .The asexual spore of Saprolegnia release motile, primary zoospores . Primary zoospores are active only for a few minutes before they encyst, germinate, and release a secondary zoospore . Secondary zoospores are more motile for a longer period of time than primary zoospores then also encysts, before it germinates into a new mycelium,



Life Cycle of *Saprolegnia Sp.*

Perononsporaceae (Downey mildew disease family) :- refers to any of several types of oomycete microbes that are obligate parasites of plants. Downy mildews exclusively belong to Peronosporaceae .

including species of *Basidiophora, Bremia, Peronospora, Plasmopara, Pseudoperonospora,* and *Sclerospora.*

1- ***Plasmopara*** sp. Sporogiophore branched is irregular with short and striaght sterigma

2- Bremia sp. The ends of sporogiophore is branched many branches like palm and bear 4 sterigma on each of it one sporangium

3- Peronospora sp. Sporangiophore is branched dichasium and its branches long, curved terminal

4- Basidiophora sp . spongophore is Simple and sowllen at the top and carries on its surface sporangia based on sterigma

5-Sclerospora sp. Sporangiophore is thick dendritic shaped branching many branches at the tip and bearing sporangia

Water molds Vs. fungi

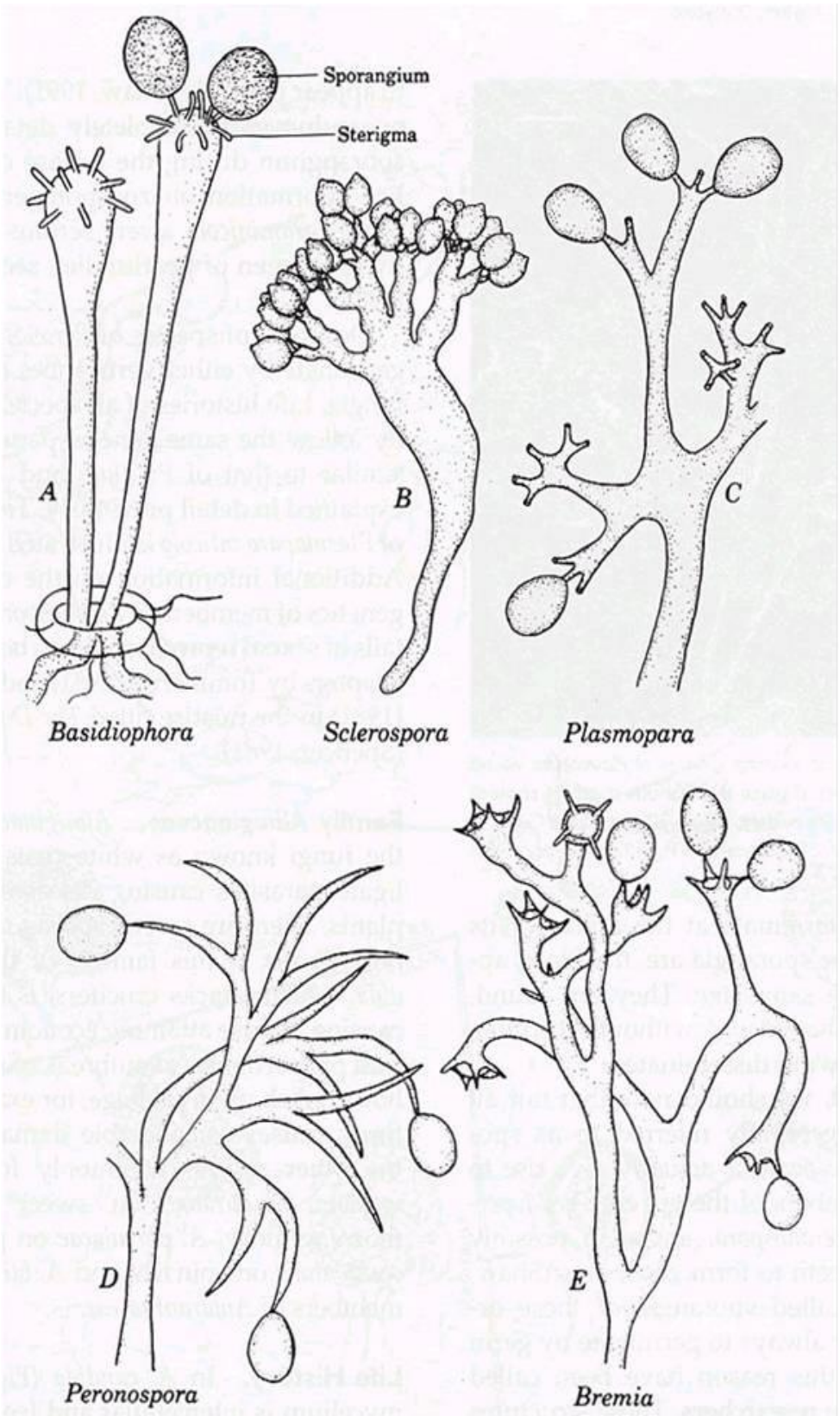
1-water molds have cellulose for their cell walls , while fungi have chitin

2-water molds have diploid nuclei , whereas fungi have haploid nuclei.

3- self-motile spores of oomycetes usually have two flagella , while fungal spores have only one .

4- they both have different metabolic pathways for synthesizing lysine (an essential amino acid).

5- number of certain enzymes differ.


Sporangium
Sterigma
A
B
C
Basidiophora
Sclerospora
Plasmopara
D
E
Peronospora
Bremia