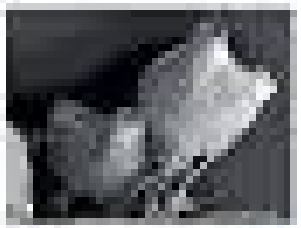
CHARACTRISTICS OF CHYTRIDIOMYCOTA

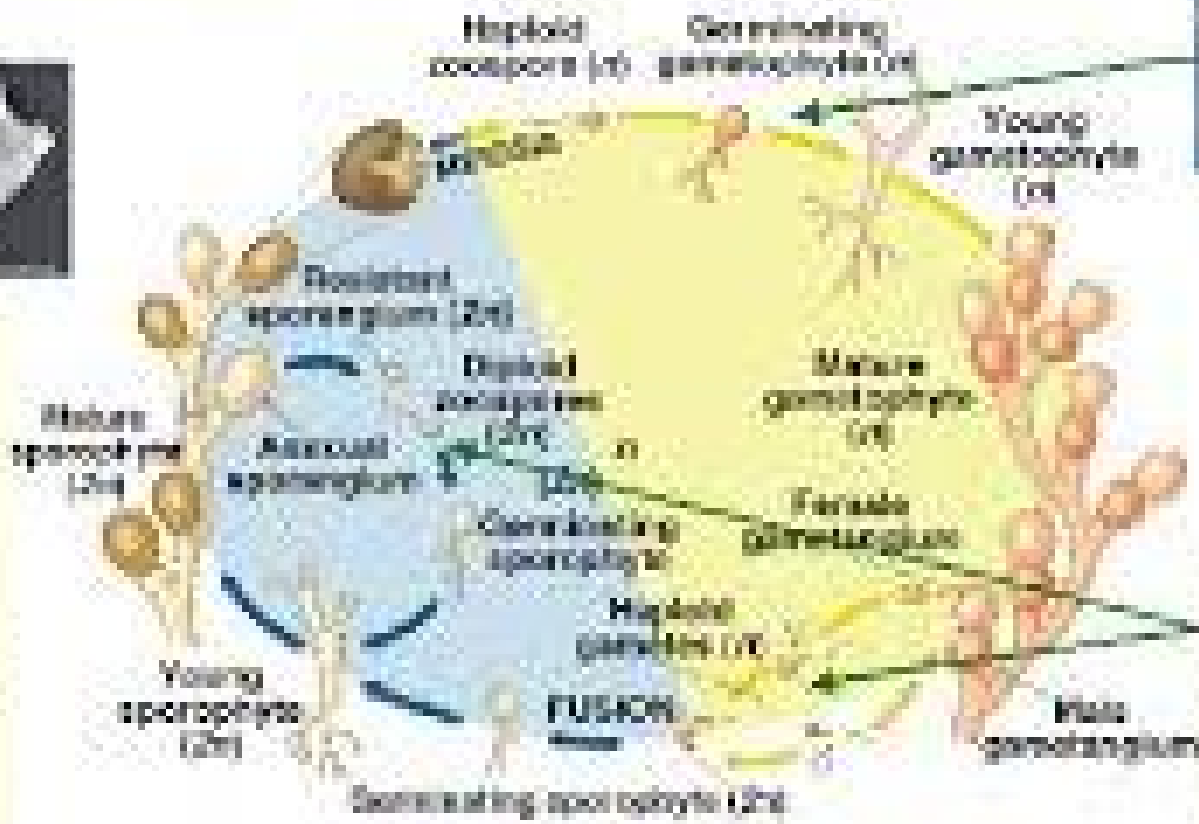
*Chytridiomycota, a phylum of **fungi** (kingdom **Fungi**) distinguished by having zoospores (motile **cells**) with a single, posterior, whiplash structure (flagellum).

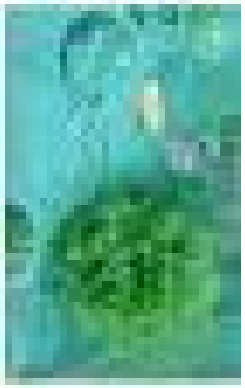
*Species are microscopic in size, and most are found in freshwater or wet soils. Most are parasites of algae and animals or live on organic debris (as saprobes).

Chytrids (Chytridiomycota)

- Aquatic fungi with flagellated zoospores; also parasites on amphibian skins (responsible for worldwide amphibian decline?)
- diploid/haploid (sporophyte/gametophyte) life cycle







Kingdom: Fungi
Division:Chytridiomycota

Characteristics

Coenocytic hyphae (no cross walls) or may be unicellular

These fungi have uniflagellated cells
(Protist characteristic)

Cell Wall made of Chitin
(Fungi characteristic)

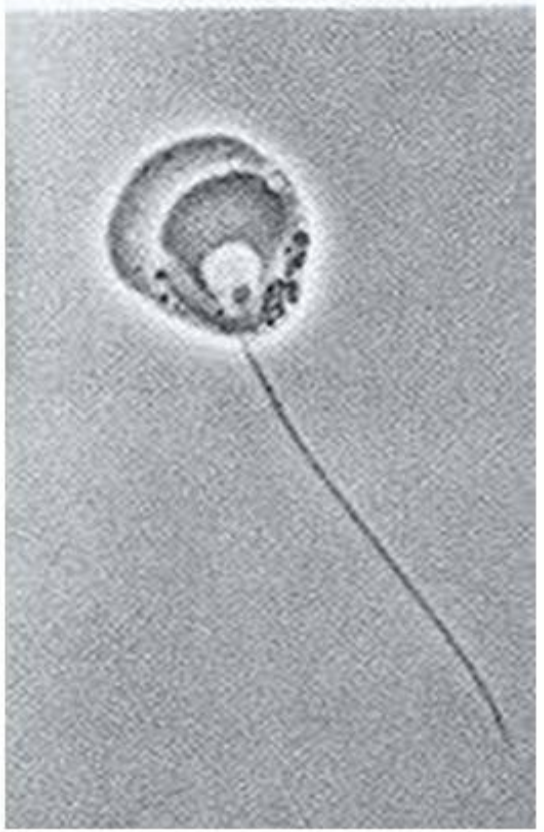
Absorptive mode of eating
(Fungi characteristic)

Example: Chytrid

(No specimen available)

Chytridiomycota

- Asexual reproduction by zoospores produced in zoosporangia
- Zoospores have one posterior flagellum
- Vegetative thallus variable – range from globose, multinucleate to hyphal forms
- Growth may be determinate or indeterminate



Chytridiomycota :

- Members of the division have unicellular redumentary to mycelial thalli.
- Their cell wall composition is mostly chitin.
- Flagellated spores and gametes are produced. Gametes and zoospores have a single, posterior whiplash flagellum.
- Sexual reproduction is variable and may be isogamous, anisogamous or oogamous.
- The ultrastructure of zoospore is a definitve characteristic of Chytridiomycota.

*The division has a single class, Chytridiomycetes, and three orders : Chytridiales , Blastocadiales, and Monoblepharidales

*The flagellum is attached to the blepharoplast within the cell.
*The motile cells of some species possess a nuclear cap which consists of RNA.
*It shields the nucleus at the anterior end of the cell. Majority of the members occur in water.

*Some are found in the soil. Many are parasitic on higher plants of economic value.
*The primitive members of this class are microscopic.
*The vegetative body in them is an acellular, coenocytic thallus which is holocarpic

*The chief characteristic feature of this class is the production of uniflagellate reproductive cells (zoospores and planogametes).

*The single flagellum is of a whiplash type and is inserted posterior. The zoospore with a posteriorly inserted flagellum is called opisthocont.

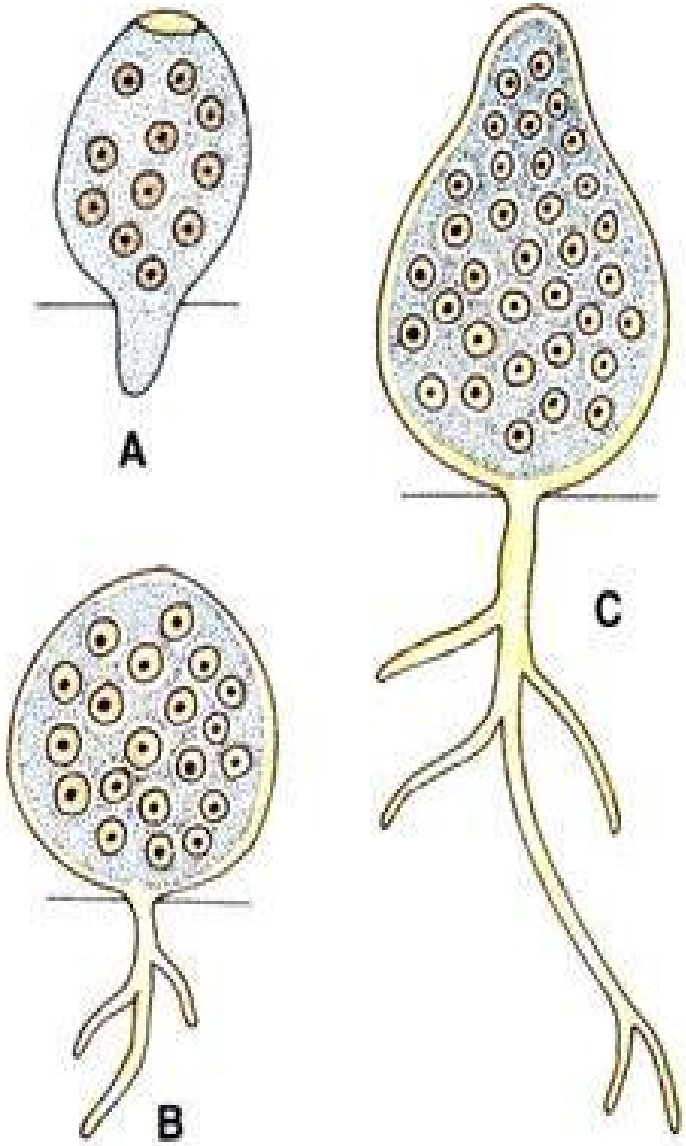


Fig. 4.1 (A-C). Evolution of Rhizomycelium in Chytrids. A, *Phlyctidium breviceps*; B, *Rhizophidium cyclotellae*; C, *Chytridium sp.*

*It has no cell wall in the earlier stages (Olpidium).

•In the more advanced species, the unicellular thallus is drawn out at one point into fine, branching hairs (Fig. 4.1 B), the so-called rhizoids which aid in anchorage and intake of nutrients (Rhizophidium).

•In slightly more complex members, there is a much branched rhizomycelium (Fig. 4.1 C). They are eucarpic.

*In still more advanced types, a scanty mycelium consisting of a few short filamentous hyphae is in evidence.
*The advanced members have a mycelium consisting of typical hyphae woven into a eucarpic mycelial meshwork.

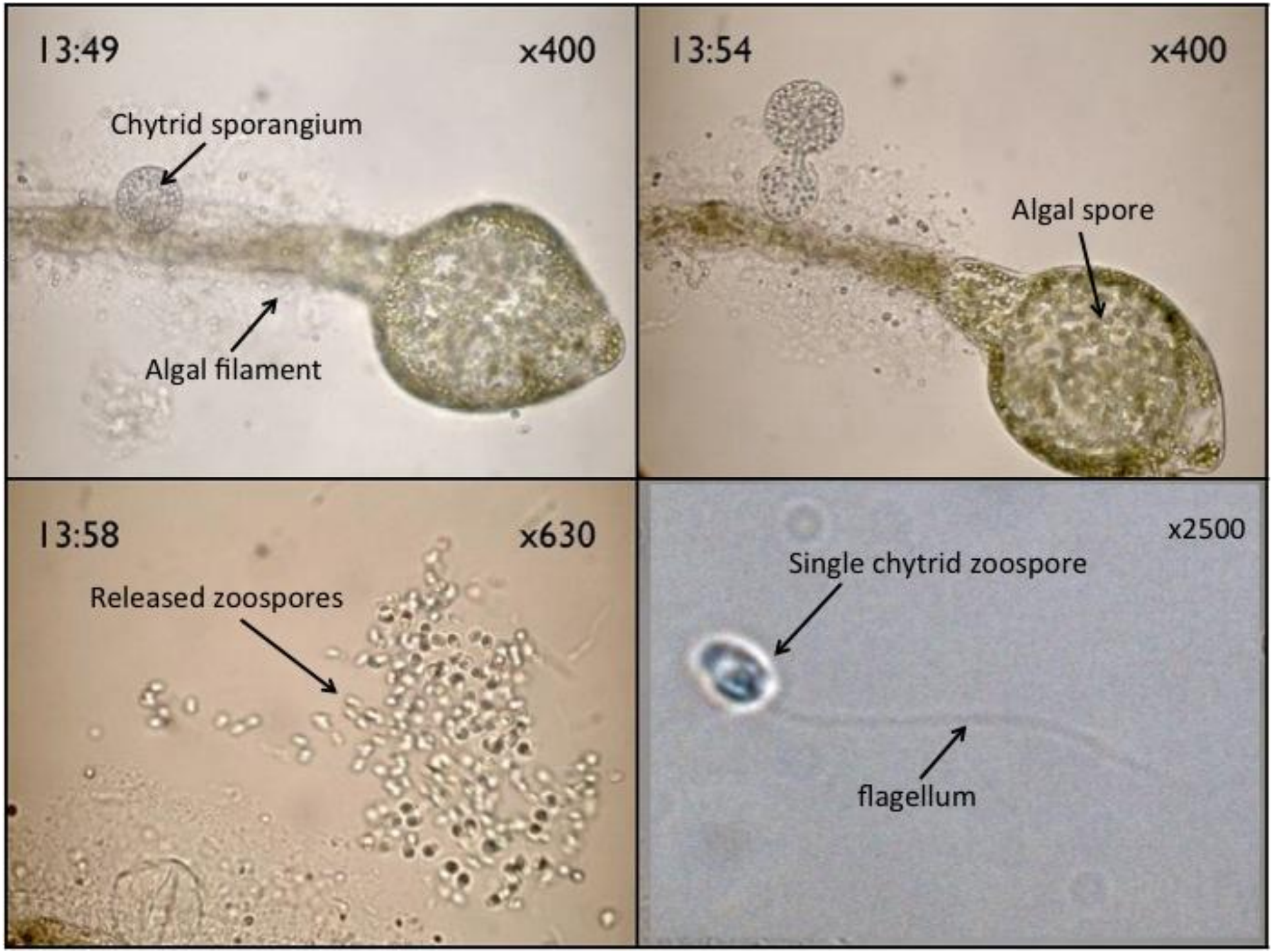
- The hyphe are coenocytic.
- Chitin is the chief constituent of the cell of hyphal wall.
- Besides, there is B glucan.
- The septa ordinarily remain suppressed during the vegetative phase but appear to delimit reproductive organs and are solid plates.

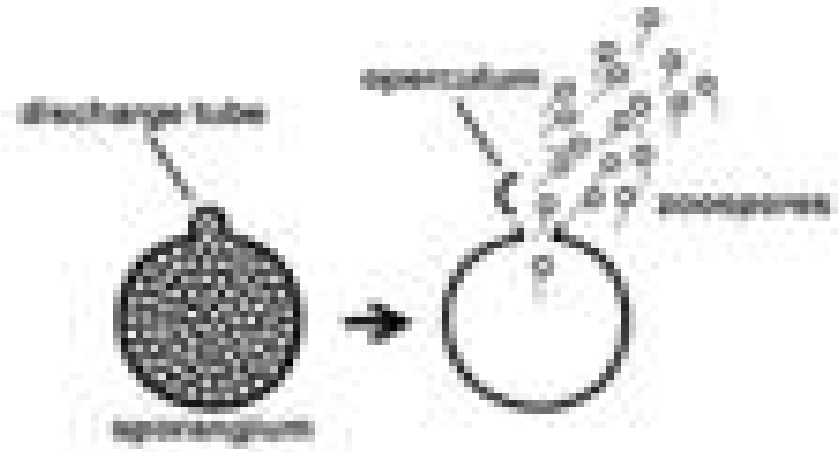
- The asexual reproductive organs are the sporangia, each of which produces numerous tiny, uninucelate and uniflagellate opisthocont zoospores.
- The liberated zoospores swim for a time. Later each retracts its flagellum and undergoes encystment. After a short period of rest, the encysted spore germinates.
- The sexual reproduction may be isogamous or anisogamous. In some it is typically oogamous.

Examples

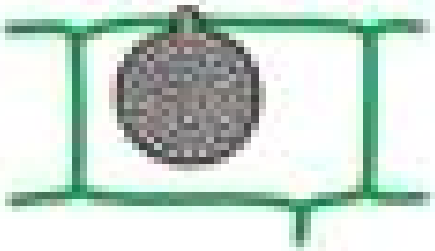
Chytridiomycota:

- Orpinomyces joyonii- found in the intestines of cattle.
- Allomyces anomalus- can withstand extreme temperatures.
- Synchytrium endobioticum- a species that causes the “potato wart”.


13:49
x400
Chytrid sporangium
Algal filament
13:54
x400
Algal spore
13:58
x630
Released zoospores
x2500
Single chytrid zoospore
flagellum

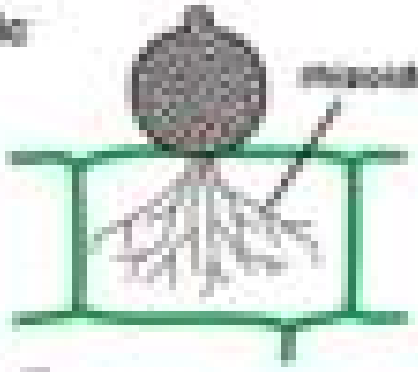


holocarpic

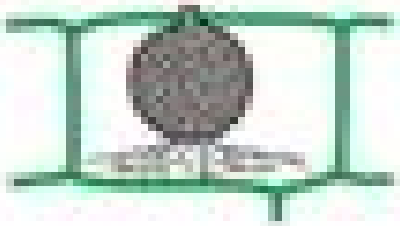


eucarpic monocentric

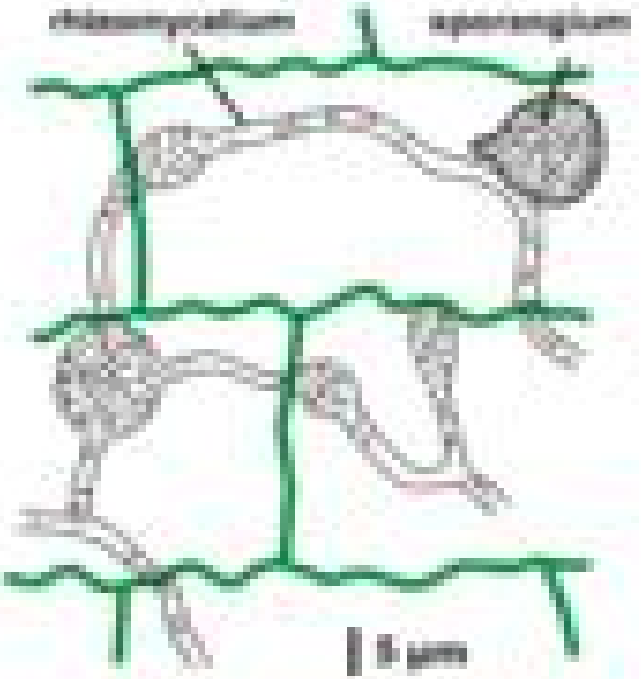
epibiotic

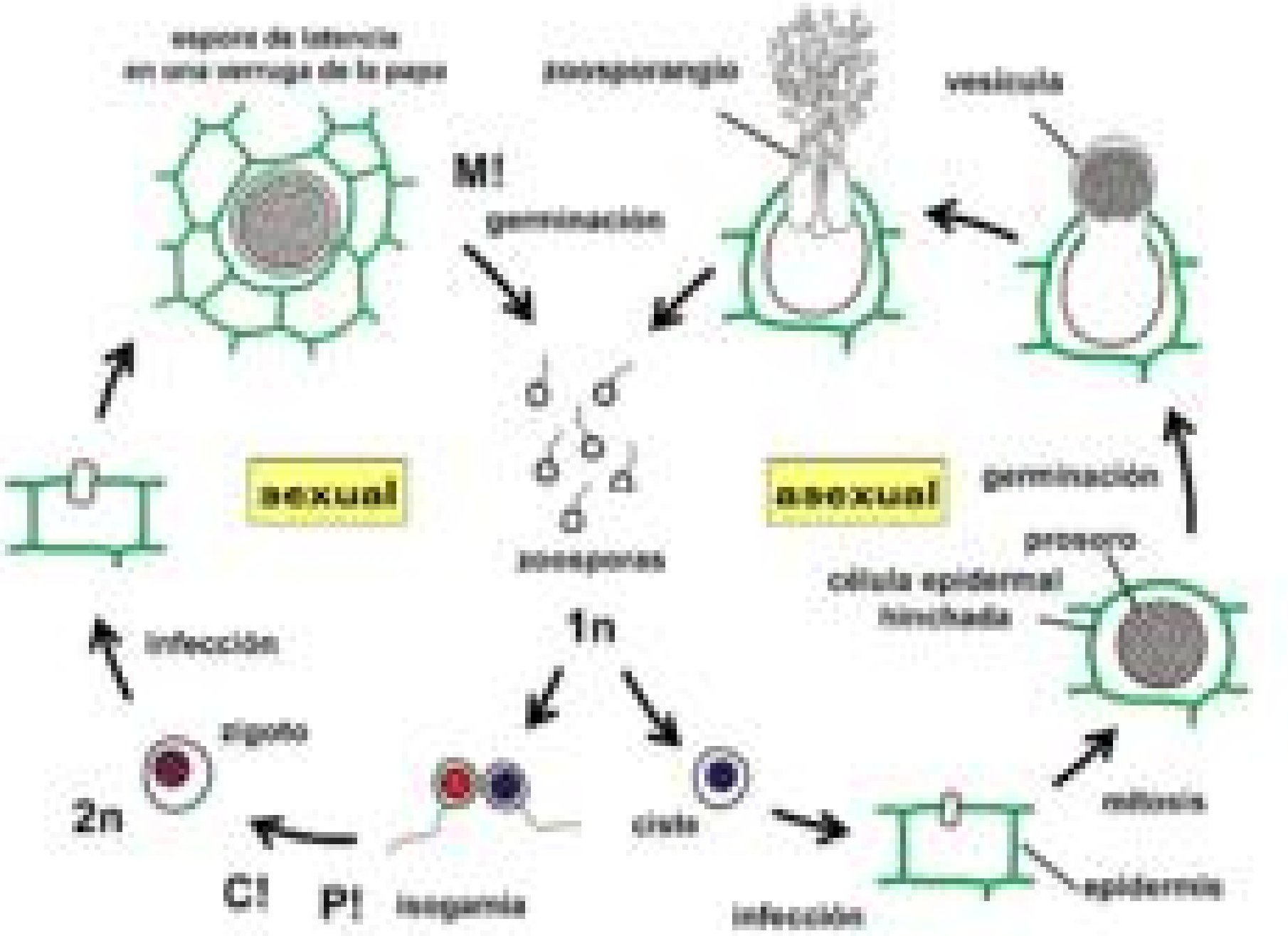


endobiotic



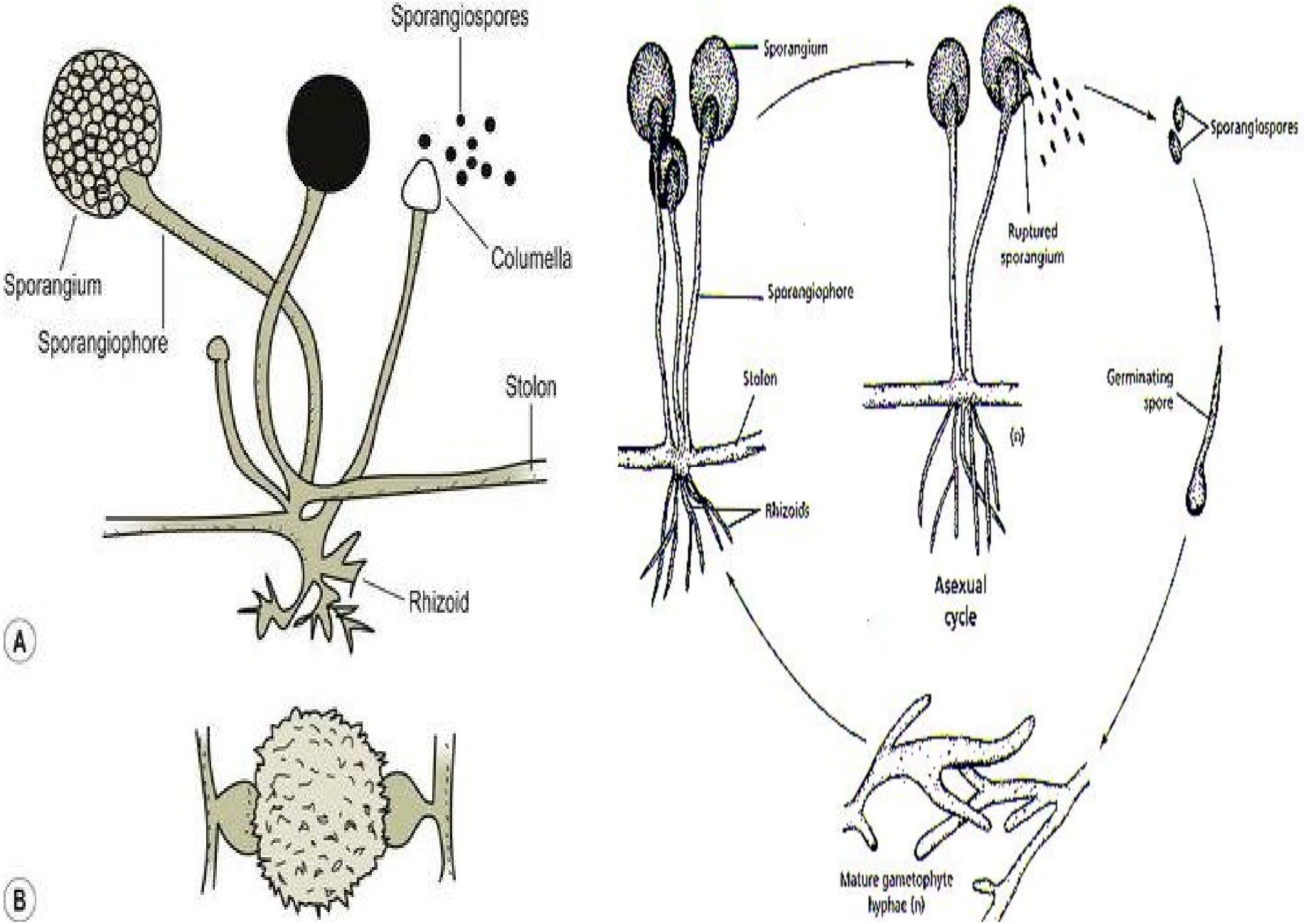
eucarpic polycentric




espora de latencia
en una verruga de la papa
zoosporangio
vesícula
M!
germinación
sexual
asexual
germinación
prosoro
célula epidermal
hinchada
zoosporas
1n
infección
cigoto
2n
C!
P!
isogamia
cisto
infección
ruptura
epidermis

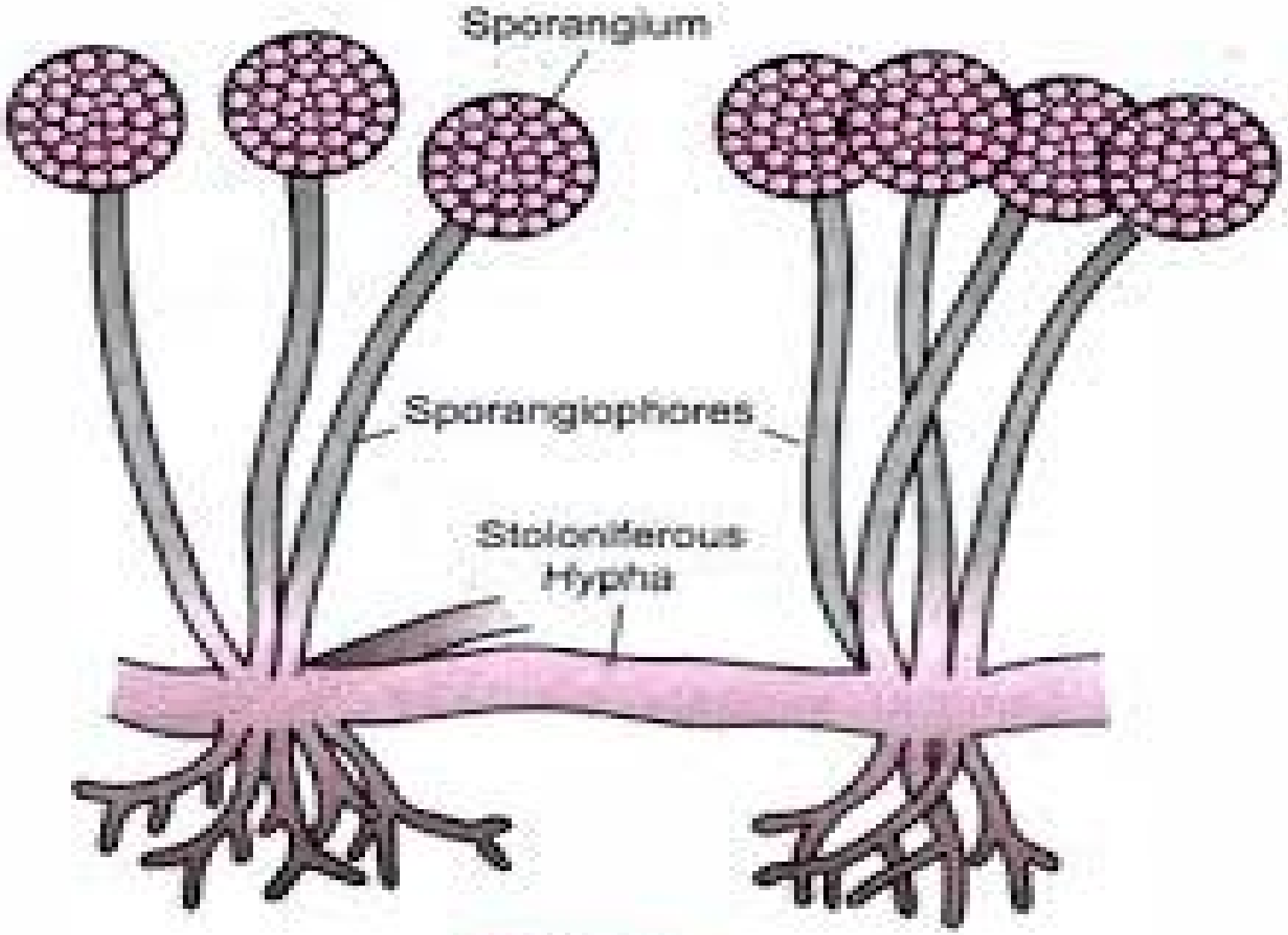
•The **Zygomycetes**, popularly known as the 'pin molds', are fungi belonging to the Eumycota, the true fungi that form extended mycelia and diverse asexual and sexual spore structures.

*The **Zygomycetes** are fungi that thrive in soil and dead plant material. They also have an exquisite taste for dung.


Sporangiospores
Columella
Sporangium
Sporangiophore
Stolon
Rhizoid
A
B
Sporangium
Sporangiophore
Stolon
Rhizoids
Ruptured sporangium
(n)
Sporangiospores
Germinating spore
Asexual cycle
Mature gametophyte hyphae (n)

*They are mostly terrestrial in habitat, living in soil or on decaying plant or animal material. Some are parasites of plants, insects, and small animals, while others form symbiotic relationships with plants.

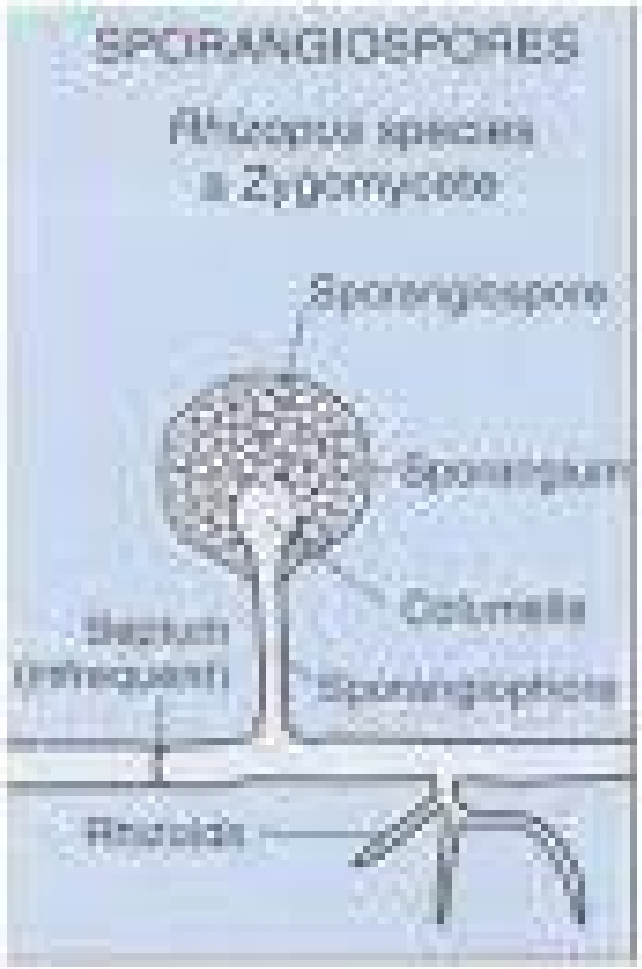
*Zygomycete hyphae may be coenocytic, forming septa only where gametes are formed or to wall off dead hyphae.



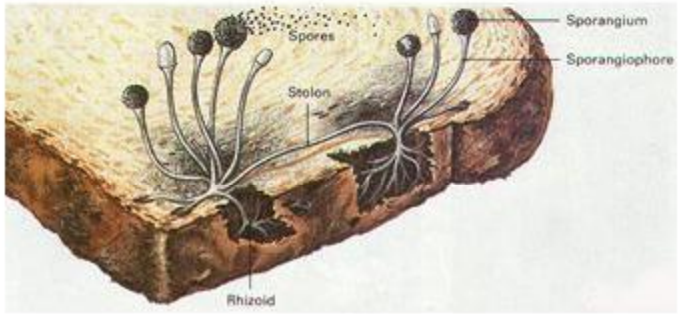
Rhizopus

Zygomycetes

- Lower fungi
- Broad, nonseptate hyphae
- Asexual spores - **Sporangiospores:** present within a swollen sac- like structure called **Sporangium**



Kingdom: Fungi
Division: Zygomycota



Characteristics

Coenocytic hyphae
(no cell walls)

Example:

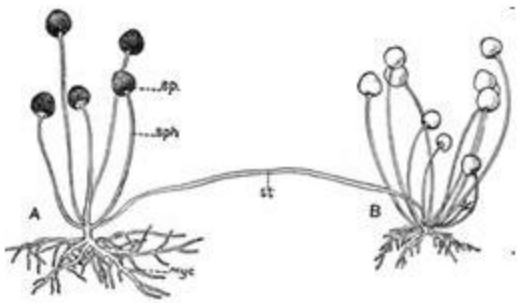
Rhizopus nigercans

Observe the petri dish and slant of the living culture *Rhizopus* growing on agar. The white hairs are the haploid hyphae that make up the mycelium.

More Zygomycetes

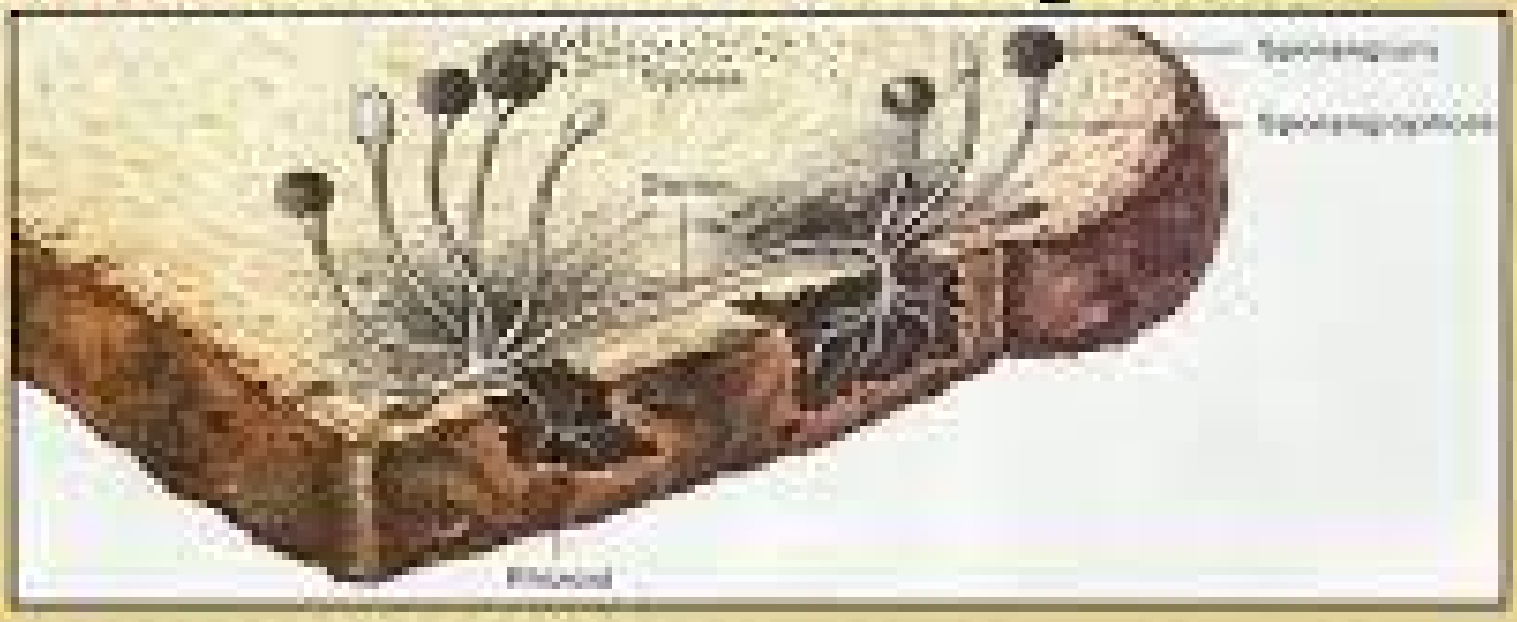
- Zygomycetes also reproduce by **asexual reproduction**. Some hyphae grow upward from the mycelium and produce globe-shaped **sporangia**, which contain many spores. These disperse, and start growing new hyphae when they find good conditions.
  - Note: all spores resulting from asexual reproduction are genetically identical to the parent.
- Black bread mold is a common example: the stalks with little black spheres at the ends are asexual sporangia.
- The zygospore lineage split from other fungi after chytrids but before ascomycetes or basidomycetes.

Rhizopus -black bread mold



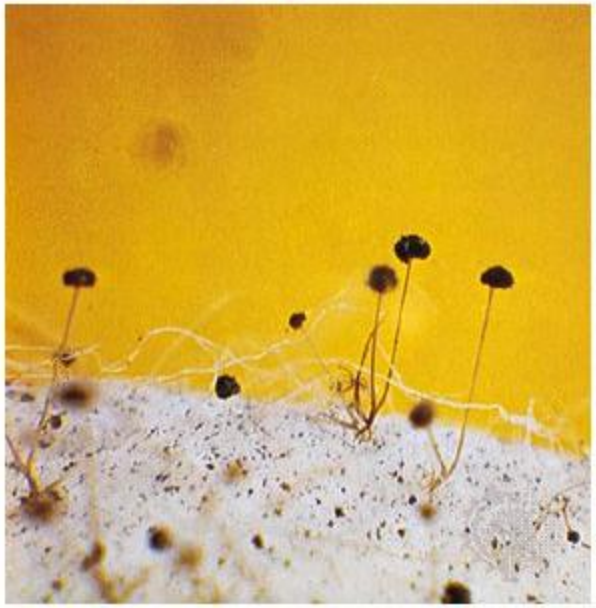
ZYGOMYCOTA

- Asexual reproductive structure called **sporangium** atop **sporangiospores** make **spores**
- **Rhizoids** anchor the mold & release digestive enzymes & absorb food
- **Stolons** connect the fruiting bodies



Phylum Zygomycota – Common Molds - Zygomycetes

- Example: Black bread mold, *Rhizopus stolonifer*
- Black bread mold has root-like hyphae that penetrates the surface of bread – called rhizoids



*The **Zygomycota** take **their** **name** from **their** method of sexual reproduction, involving the production of conjugating gametangia, leading to the production of zygosporangia and zygospores. ... Zygospores are usually thick-walled resistant structures capable of preserving the fungus over long periods of dormancy.

Zygomycota are terrestrial organisms. They live close to plants, usually in soil and on decaying plant matter.

Because they decompose soil, plant matter, and dung, they have a major role in the carbon cycle.

Zygomycota are also pathogens for animals, amebas, plants, and other fungi.

Characteristics of Zygomycota

1. Zygomycota ,all true fungi, produce cell wall contain chitin
2. Somatic phase as mycelia, hyphae which are generally coenocytic because they lack cross walls of septa.
3. Gametangial Copulation is a type of sexual reproduction in zygomycota in general *the gametangia fuse with each other, lose their identity and develop into a zygospore*
4. most reproduce asexually by producing sporangiospore.
5. Chlamydospores are another type of asexual spores different from sporangiospores

OOMYCETES DEFINING CHARACTERISTICS

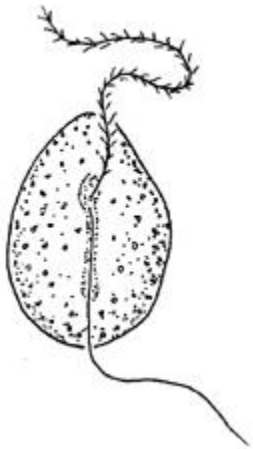
- Asexual reproduction is by zoospores
- Zoospores have flagella that are anisokont (unequal) and heterokont (different) (straminipilous)
- The anteriorly directed flagellum bears two rows of tubular tripartite hairs
- The posteriorly directed flagellum is a whiplash type

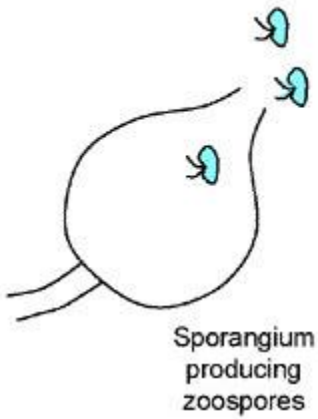
Oomycota

- oomycetes/water molds and downy mildews
- consists of finely branched, single-celled filaments
- cell wall not chitin (cellulose)
- protist-like fungi; sometimes classified as protista
- diploid stage is dominant
- e.g. water molds (saprobes or parasites of fish)
- downy mildews (plant parasites – potato blight)

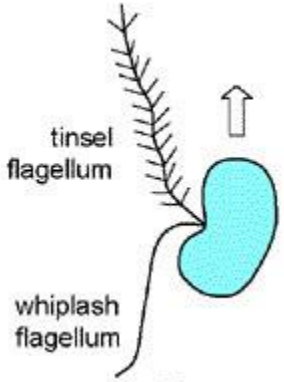
General characters

1. Mostly parasitic with intracellular haustoria
2. Narrow diameter hyphae
3. Trend towards terrestrial habitats
    a. Loss of primary zoospore stage
    b. Trend towards loss of secondary zoospore stage.
4. Inability to synthesize sterols

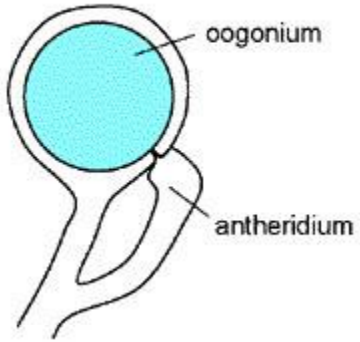




Sporangium
producing
zoospores



Zoospore



Oogonium with
antheridium