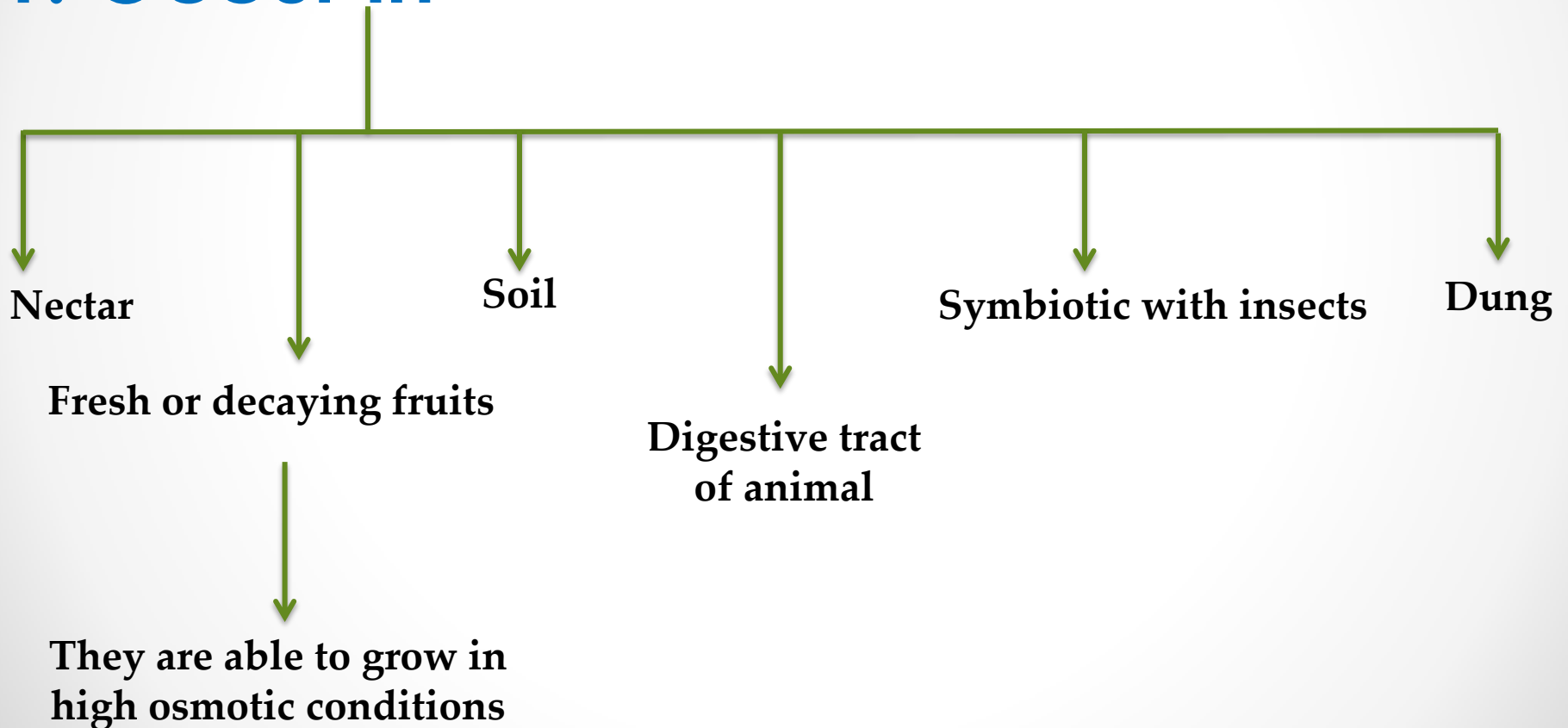


# Class: Saccharomycetes

- General Characters:

## 1. Occur in



## 2. Mycelium is absent or poorly developed.

- if present it is usually septate and septa have a series of minute pores rather than a single simple pore.
- They are unicellular and reproduce asexually by budding e.g. *Candida albicans*.
- Some species are dimorphic that shift between filamentous (mycelium or pseudomycelium) and yeast stage.

3. Cell wall is usually lacking chitin except around bud scars. Wall polysaccharides are primarily mannans and  $\beta$ -glucans.

#### **4. Absence of dikaryotic phase in the life cycle.**

- **Plasmogamy occurs**
- **Karyogamy and zygote develops directly into an ascus.**

#### **5. Absence of ascogenous hyphae and ascocarps.**

- **Asci are formed singly or in chains, sometimes not differentiated morphologically from vegetative cells.**
- **Gametangial fusion occurs by fusion of yeast cells.**

# *Saccharomyces*

- General Characters:-

1- *Saccharomyces* is a wide-spread genus known as *S. cerevisiae* occurs naturally on ripe fruits .

2- Used in the fermentation of certain beers and wines and in baking.

3- The thallus is unicellular; the cell is elliptical and multiplies by budding.

4- The wall may be thick and multi-layered

- It composed of glucan, mannan, chitin (in small quantities) and proteins.

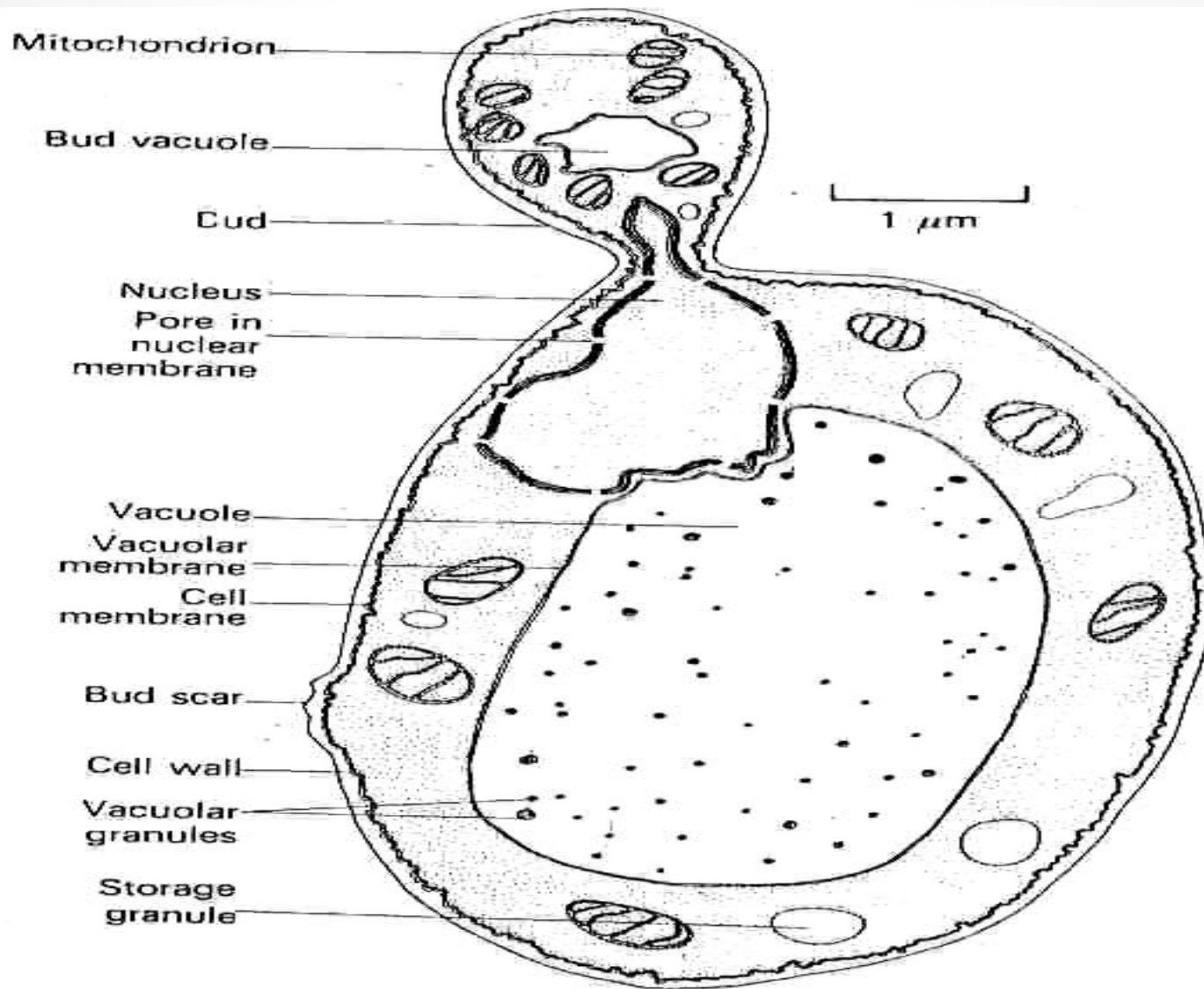
**5- Plasmalemma contains a series of shallow elongated pits or invaginations.**

**6- They have also, endoplasmic reticulum, ribosomes, mitochondria, lipid granules, Golgi apparatus, and a nucleus enclosed in a perforated nuclear membrane.**

**7- The vacuole is prominent, large and limited by the tonoplast; it contains a watery substance and granules of volutin and lipid.**

**8- The nucleus is hard to see, but in budding yeast cells it can be found between the vacuole and the bud. Mitosis is intranuclear, i.e. nuclear membrane remains intact during division.**

# Saccharomyces



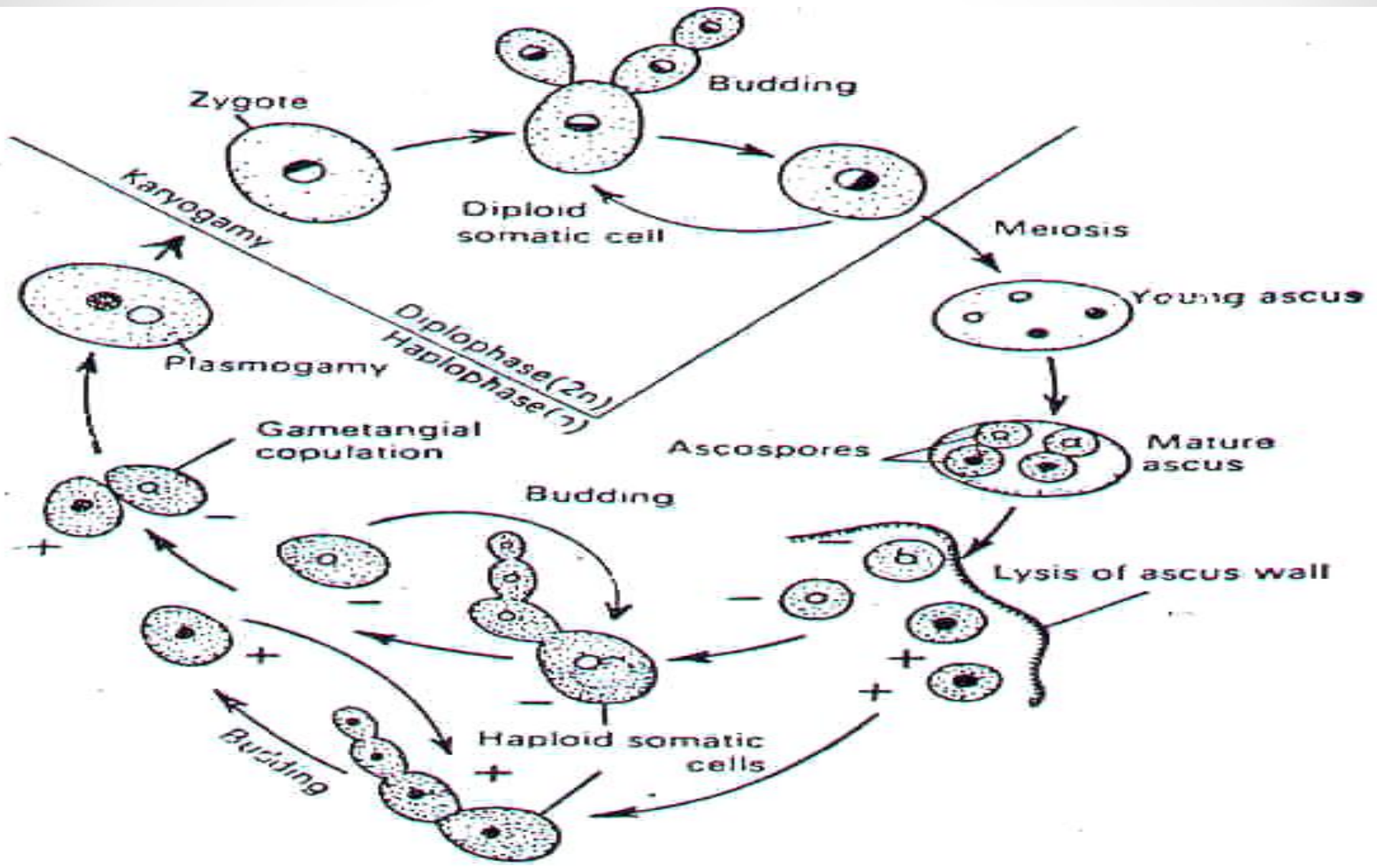
# Life Cycle

- Both haploid and diploid phases are equally extensive and important.
- Both types of vegetative cells multiply by budding and are eventually transformed into the other type.
- The haploid cells of opposite mating types after fusion (plasmogamy and karyogamy) give rise to diploid cells and thus initiate the diploid phase.
- The diploid nucleus undergoes meiosis and forms four haploid nuclei around which four ascospores are produced. Thus the diploid cells are potential asci.

- **Ascospores release after lysis of the ascus wall and grow into haploid vegetative cells.**
- **The diploid state may be established either by fusion of ascospores inside the ascus or of haploid cells.**
- **Fusion may also take place between an ascospore and a haploid cell.**
- **Most strains of *S. cerevisiae* are heterothallic and the ascospores are of two mating types.**



# Life Cycle of *Saccharomyces*



**Class: Leotiomycetes**

**Order: Erysiphales**

**Family: Erysiphaceae**

- **General Characters:**

- 1- Are obligate biotrophs of plants causing powdery mildew diseases.

- Their conidia cover the infected area with a unique, white-powdery appearance.

- The diseases are of economic significance e.g. cereal and grass mildews caused by *Erysiphe graminis*.

**3- Mycelium is largely superficial and hyaline, anchored to the host epidermis by appressoria.**

**4- Nutrients are obtained via intracellular haustoria.**

**5- Ascoma are cleistothecial, globose, solitary or aggregated, dark, usually with complex appendages; interascal tissue is absent.**

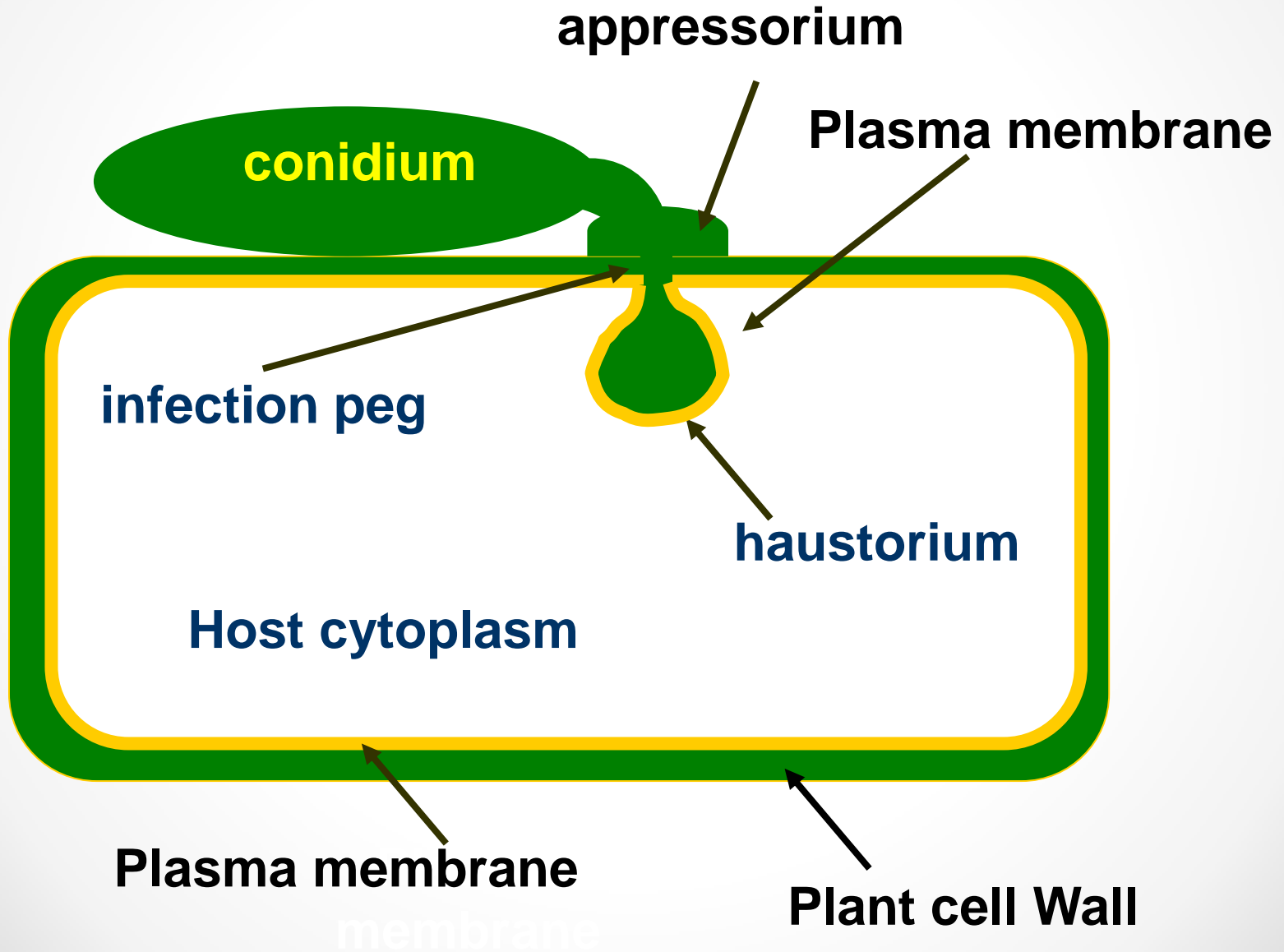
**6- Asci are broadly clavate and thin-walled.**

**7- Ascospores are hyaline, ellipsoidal and aseptate.**

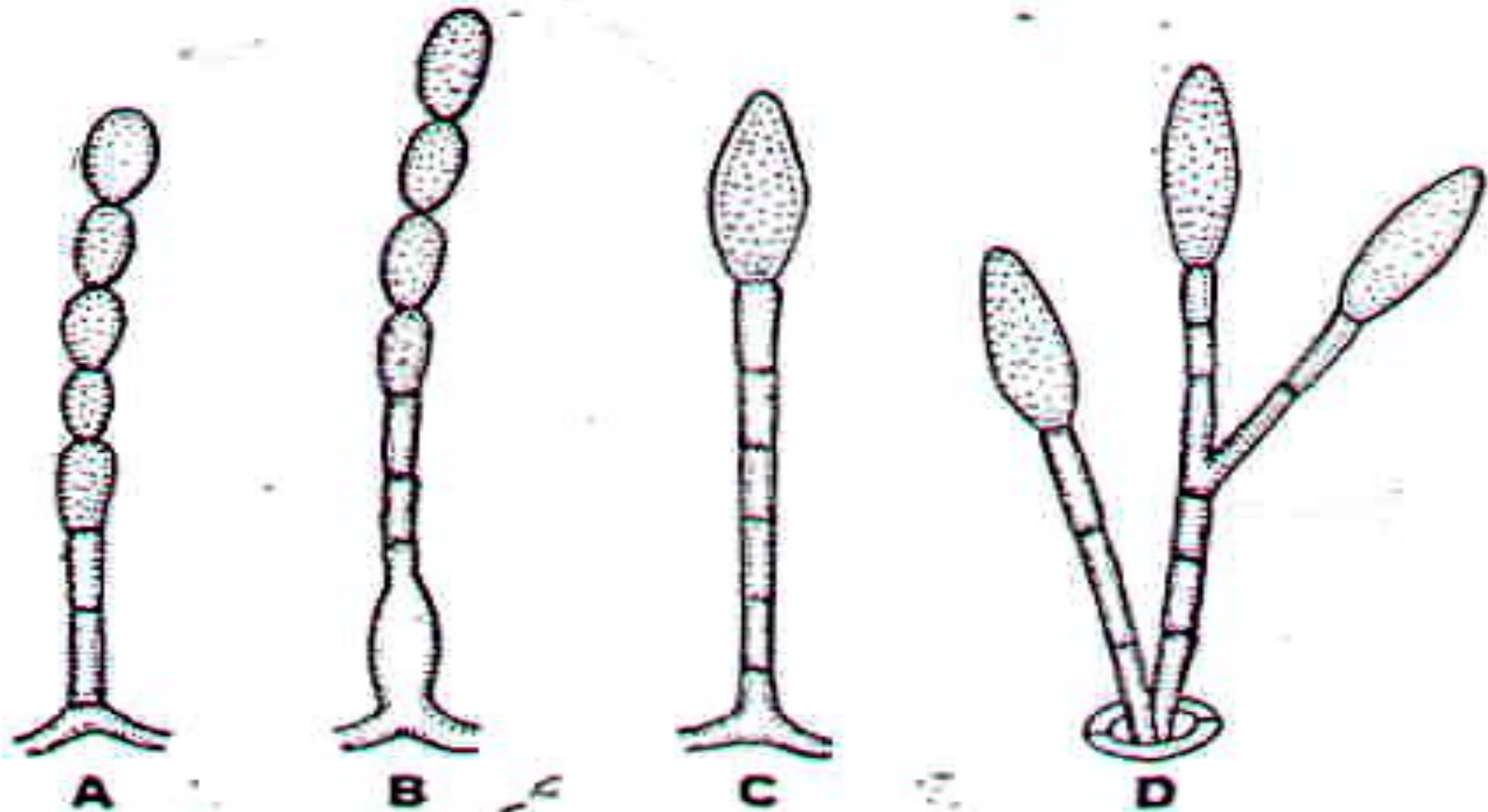
**8- Asexual reproduction takes place by conidia.**

- **Germination of conidium**
- **involves formation of germ tube, appressorium and infection peg.**
- **The apex of the infection peg enlarges to form haustorium.**

# Infection processes



# Conidial forms of Erysiphaceae



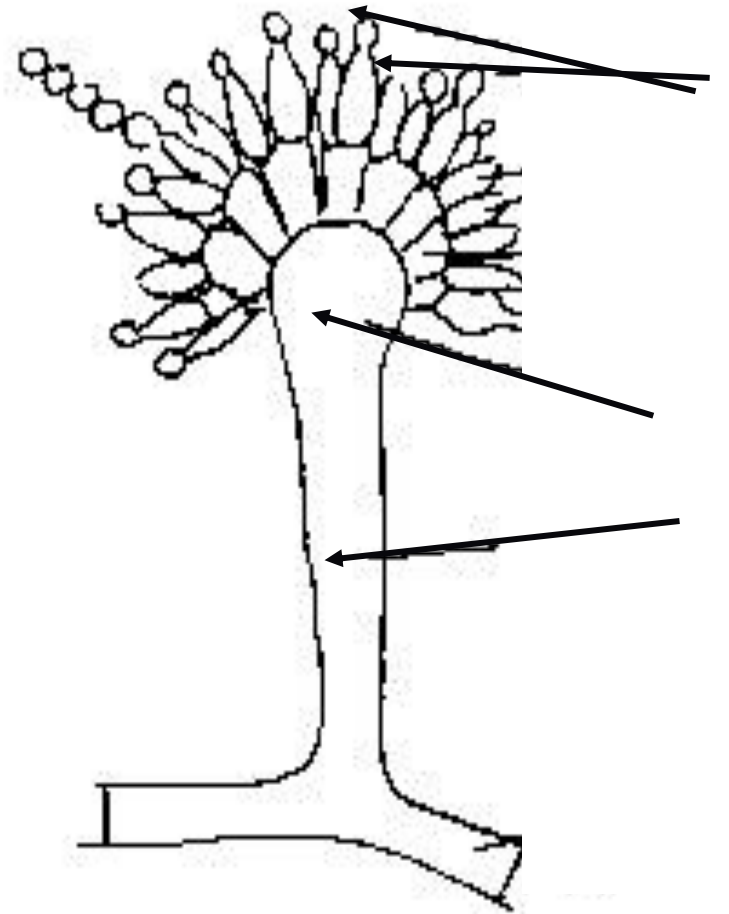
Conidiophore types. A, *Erysiphe cichoracearum*; B, *E. graminis*; C, *Phyllactinia rigida*; D, *Leveillula*.

**Class: Eurotiomycetes**  
**Order: Eurotiales**  
**Family: Trichocomaceae**

• **General Characters:-**

- 1- This family comprises genera with varied ascomatal wall, which may be pseudoparenchymatous or hyphal.
- 2- Asci are small, globose and often formed in chains.
- 3- Ascospores are hyaline and often ornamented. Examples are: ***Aspergillus*** and ***Penicillium***.
- 4- Species of this family have both perfect and imperfect stages of the same fungus; e.g. *Eurotium* has been given to the perfect stage of some species of *Aspergillus* (e.g: *A. repens*) and *Talaromyces* to the perfect stage of some species of *Penicillium*.

# *Penicillium* and *Aspergillus*





# Class: Lecanoromycetes

- General Characters:-

1- It is a heterogeneous group including species that:

Symbiotically  
with algae or  
cyanobacteria  
to form  
(Lichen)



Saprophytic  
species

2- Ascoma are apothecial.

# General Characters of Lichen:-

1- Lichens inhabit infertile soils, rocks, trees and so may play an important role in weathering processes and soil formation.

2- Lichens are sensitive to aerial pollutants, especially to sulphur oxides, so that they can be used as good indicators of air pollution. Such as: *Xanthoria*, *Lecanora* and *Cladonia*.

# Lichen



**Crustose  
encrusting lichens**



**Foliose  
leafy lichens**

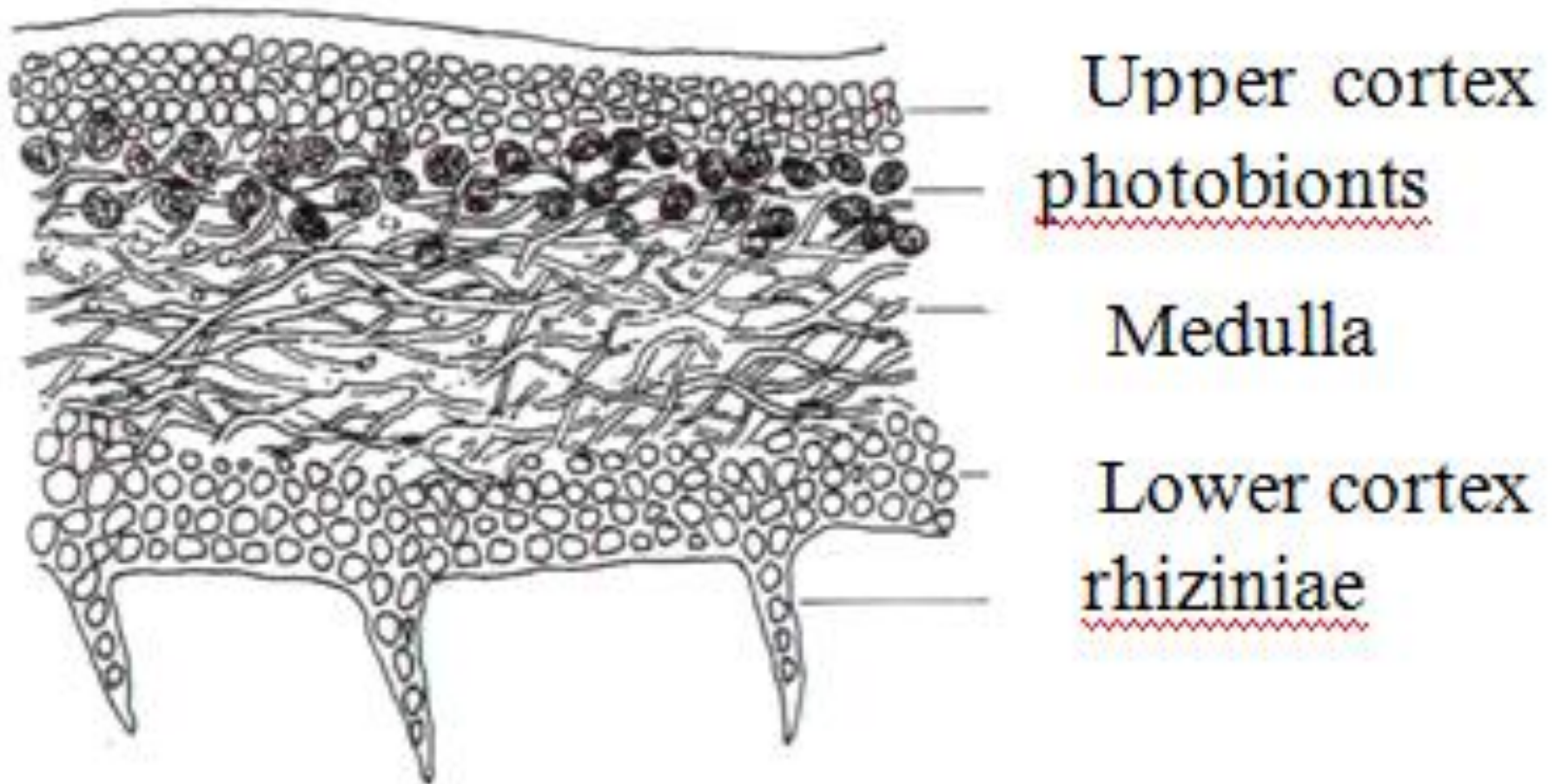


**Fruticose  
shrubby lichens**

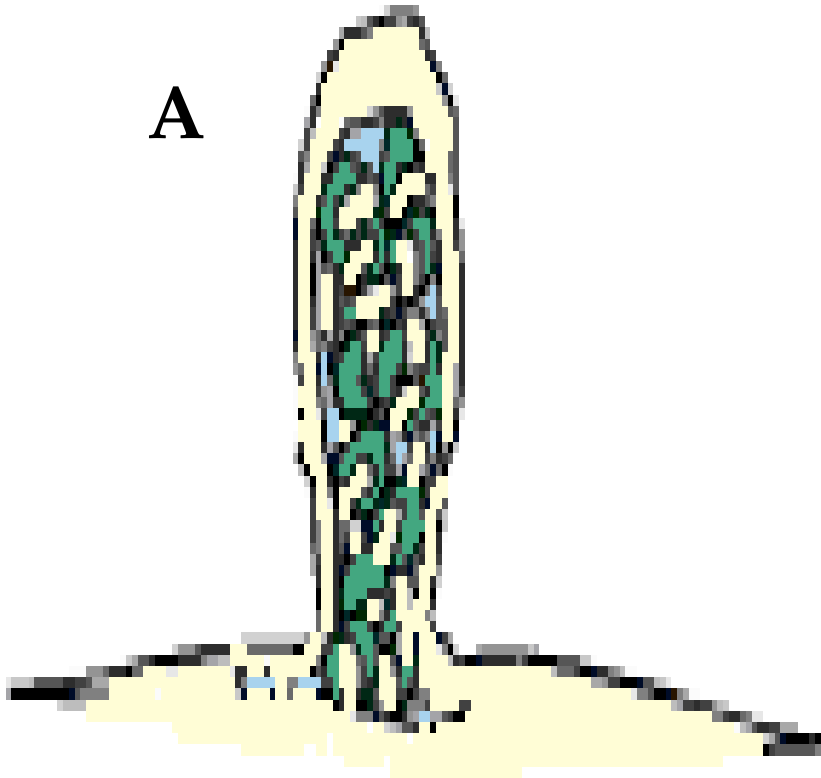
# Reproduction

- **Asexual reproduction** occurs by isidia (photobiont-containing projections from the cortex) and soredia (non-cortex combinations of photobiont and mycobiont)
- **Sexual reproduction** occurs by means of violently discharged ascospores. The ascoma may be apothecia or perithecia. Spores germinate close to the suitable photobiont and initiating a new lichen thallus

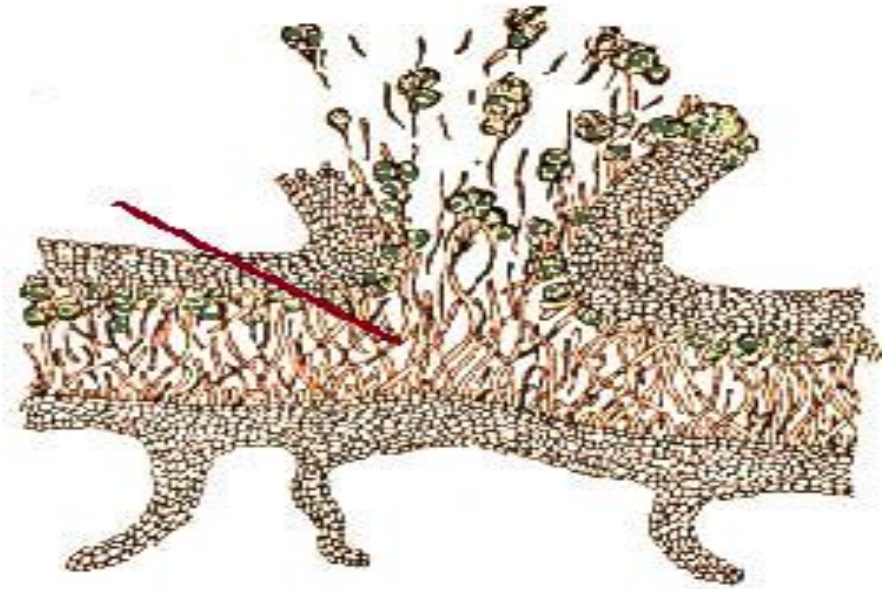
# Cross section of a foliose lichen thallus



A



B



**Asexual reproduction of lichens, (A) isidia and (B) soredia.**