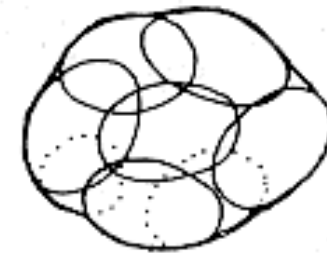
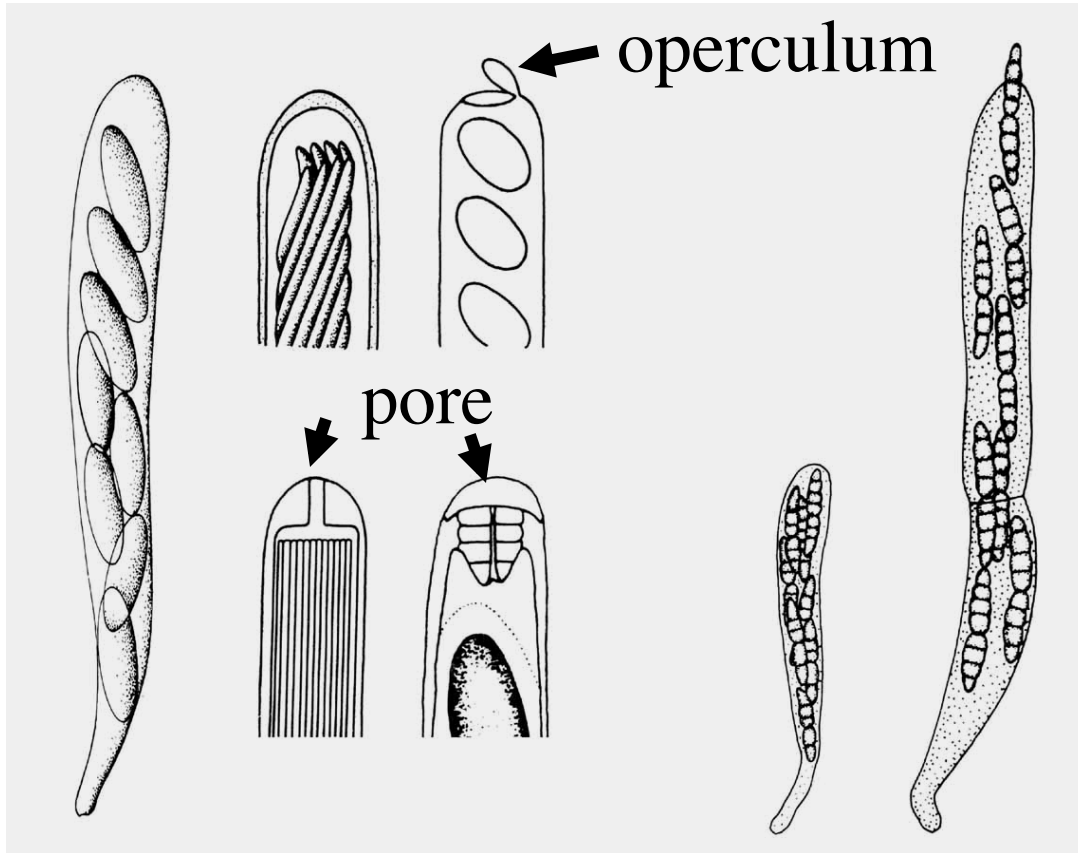


Simplified ascus types

unitunicate

bitunicate

But numerous variants are recognized

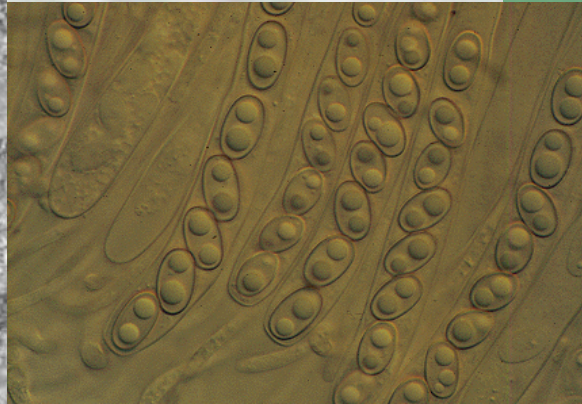
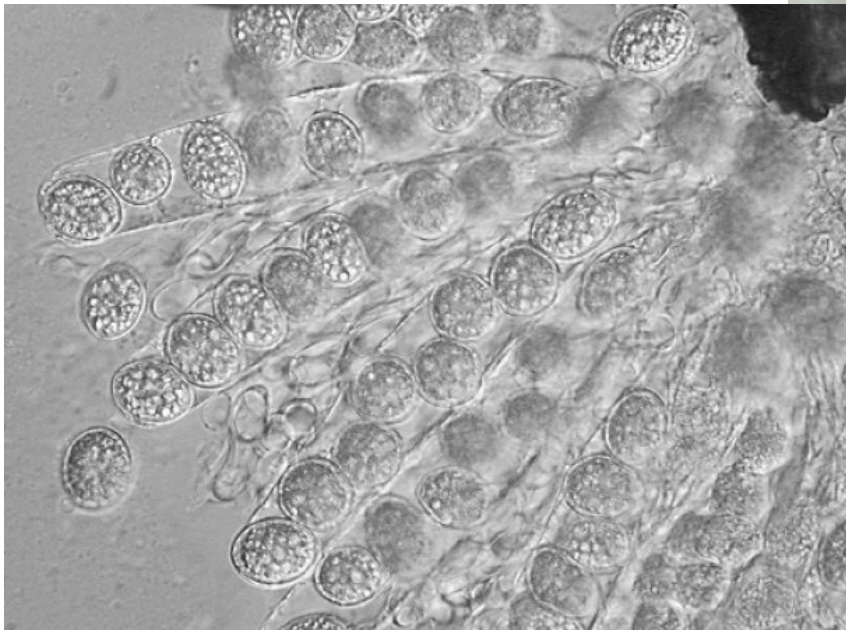


'prototunicate' ascus



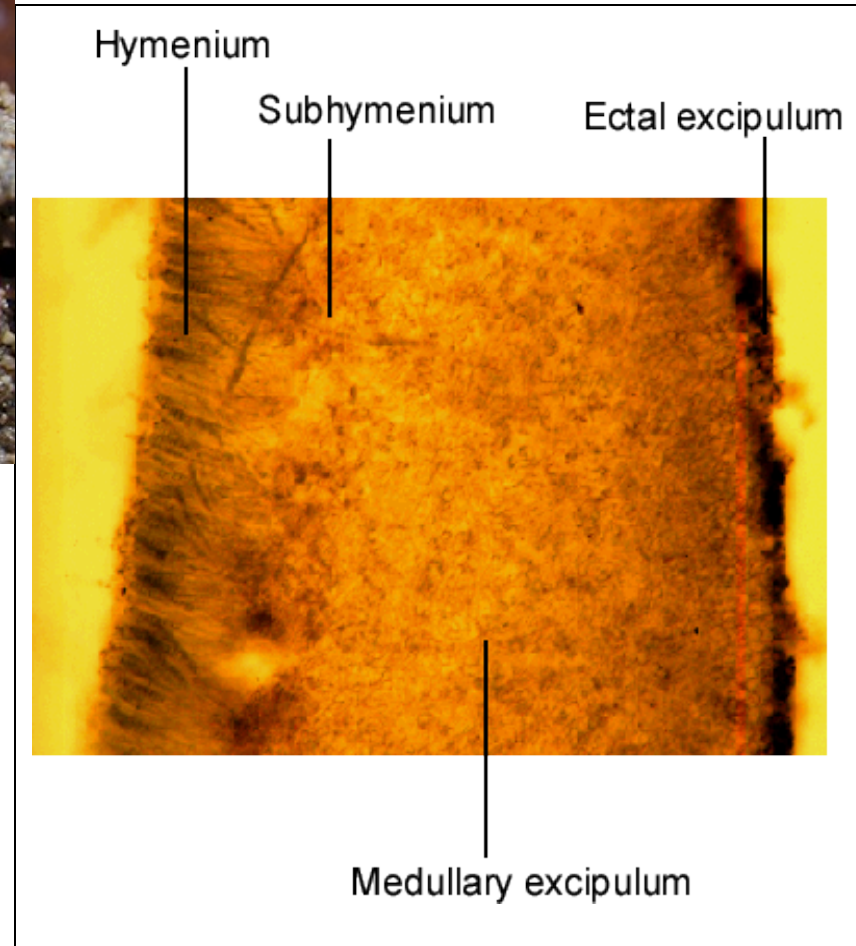
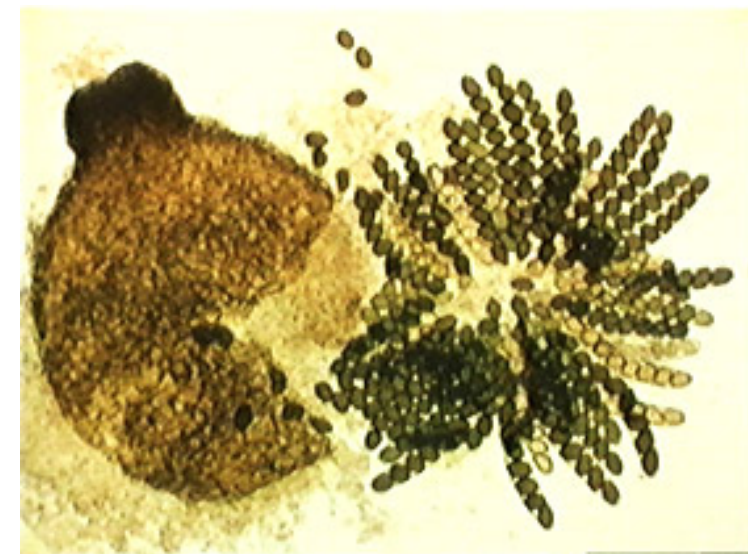
Ascospores

- +/- pigmentation (fungal melanin)
- aseptate, uniseptate or multiseptate
- +/- appendages
- +/- sheaths
- variety size, shapes, arrangement in ascus
- usually 8 per ascus



Hymenium

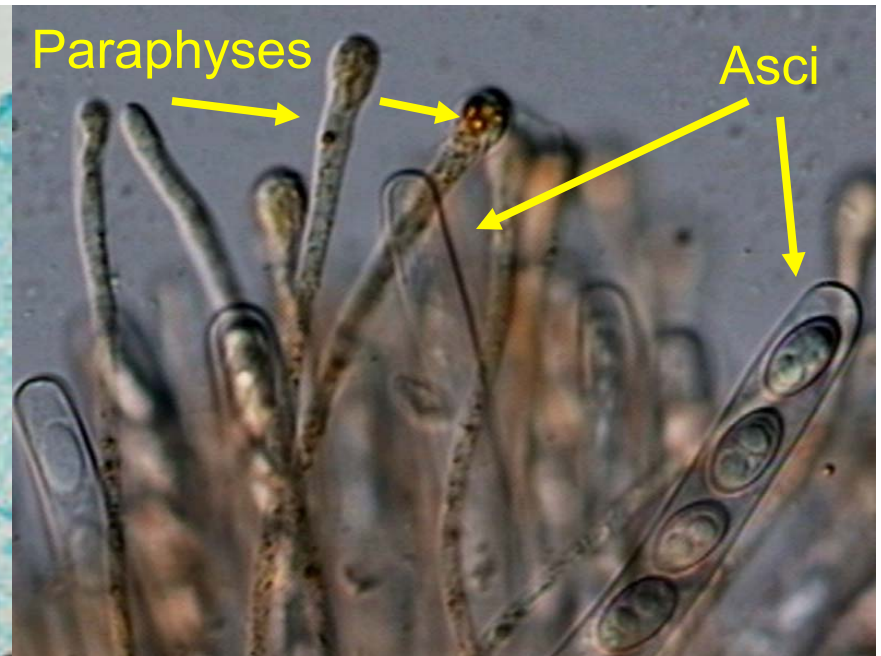
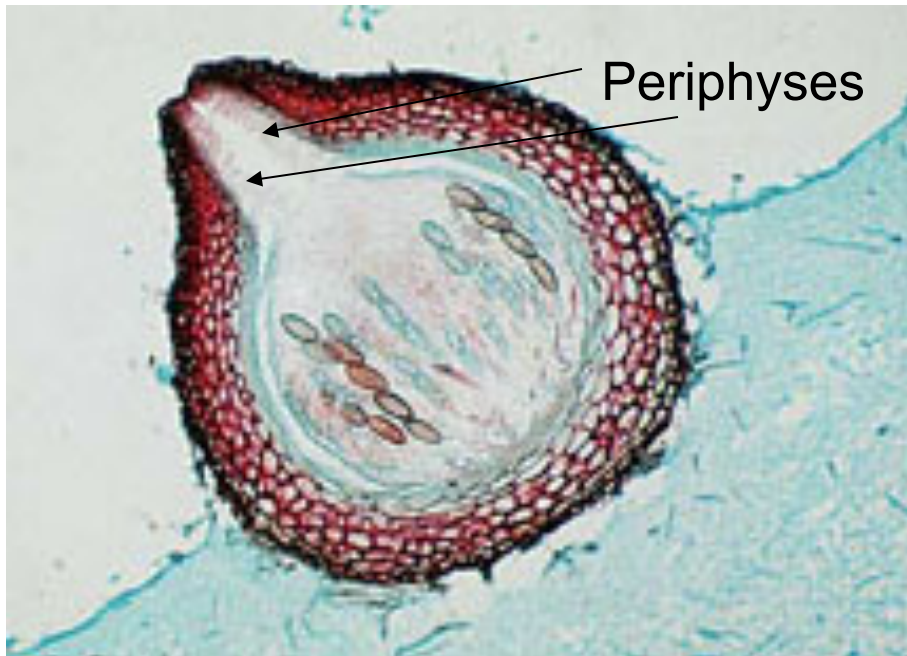
- fertile tissue of ascocarp
- Asci and sterile elements-paraphyses, pseudoparaphyses

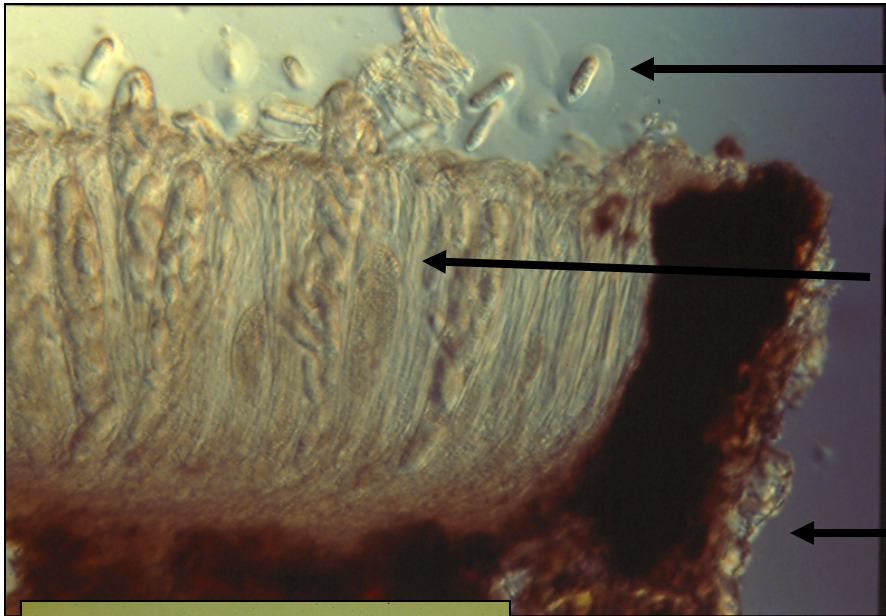


Sterile elements associated with hymenium

May be present or absent

- Paraphyses – modified hyphae growing among the asci may have variously modified shapes, like cystidia
- Periphyses - hyphae in the ostiolar canal of an ascocarp
- Pseudoparaphyses - originate above the asci of a pseudothecium; grow down among the developing asci

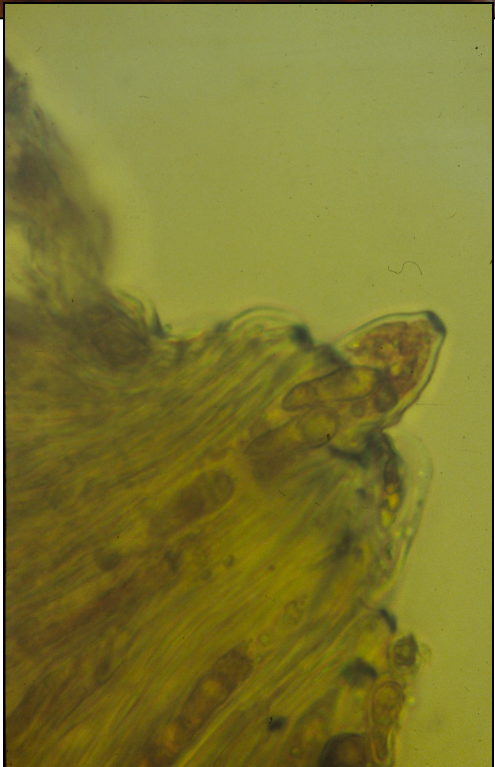




Sheathed ascospore

Hymenium

Excipulum

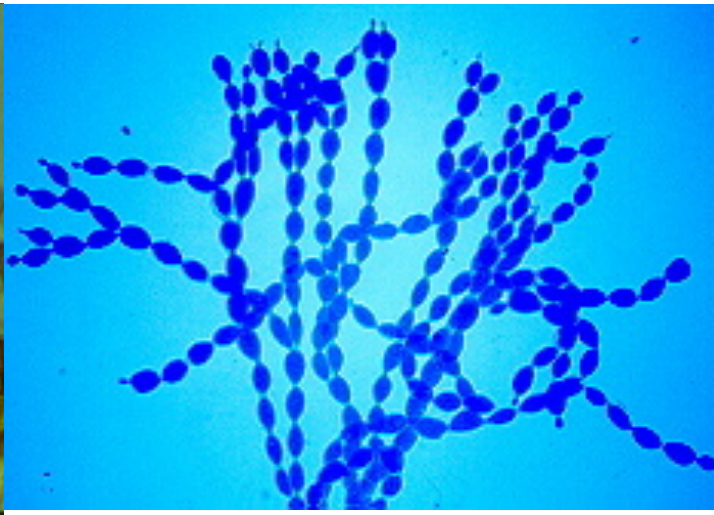
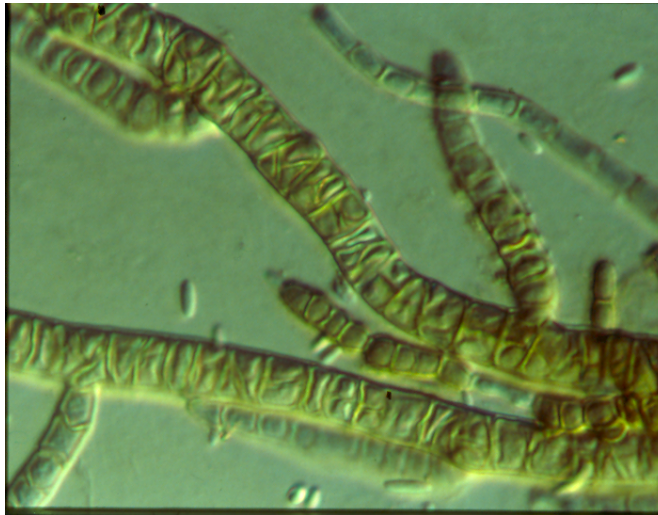
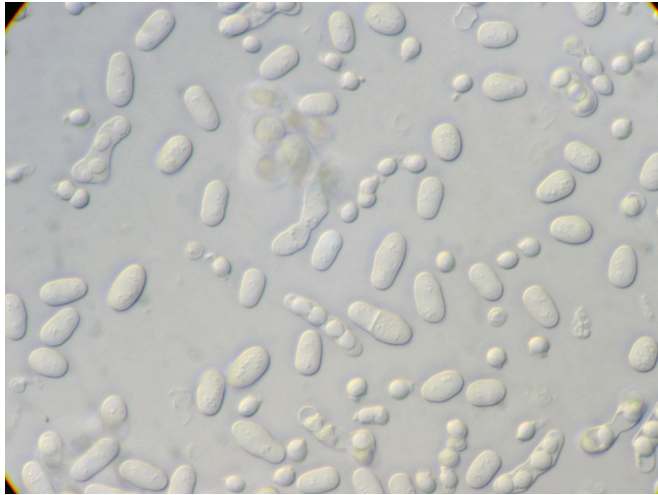


Ascus iodine tip reaction

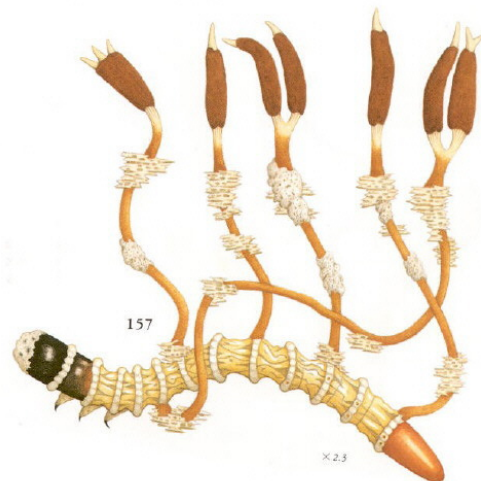
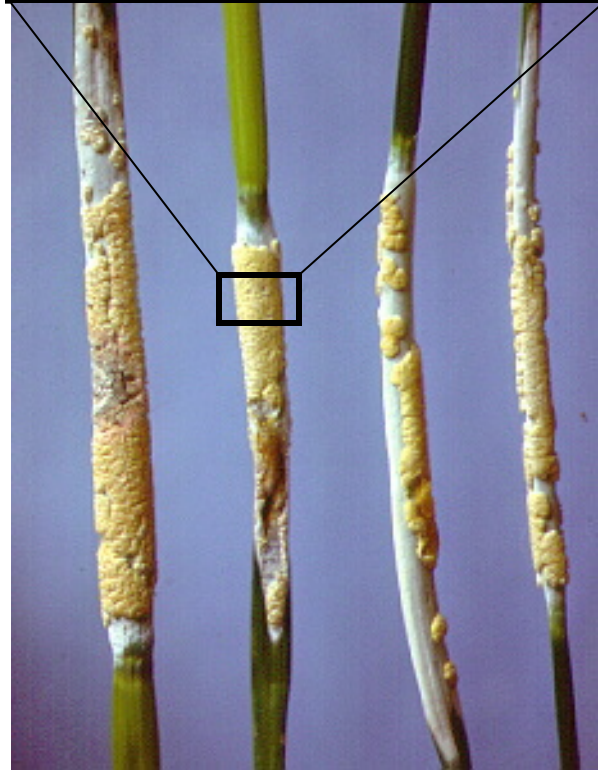
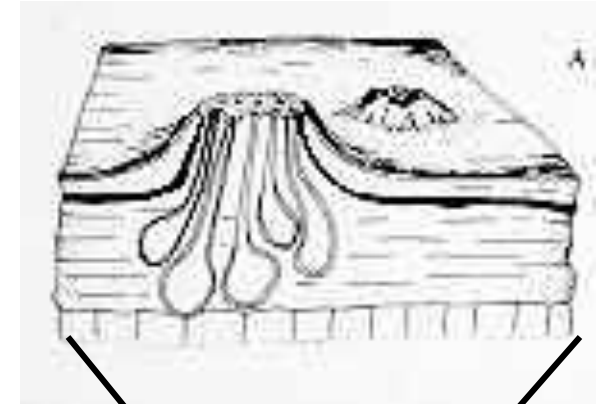


Somatic Structures

- thallus: yeast, filamentous, or dimorphic



Stroma, pl. stromata: Aggregations of perithecia, apothecia, or pseudothecia embedded in supporting tissue



Current classification of the phylum Ascomycota

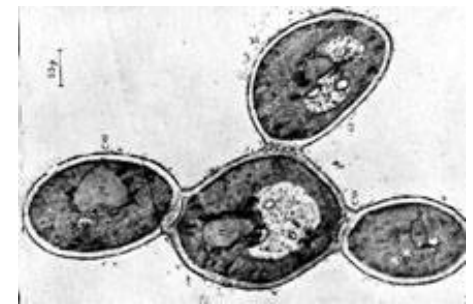
subphylum Taphrinomycotina (=Archeascomycetes)

- early diverging Ascomycota
- may not be a single group
- primitive ascomycetes
- **Pneumocystis, Schizosaccharomyces, Neolecta**



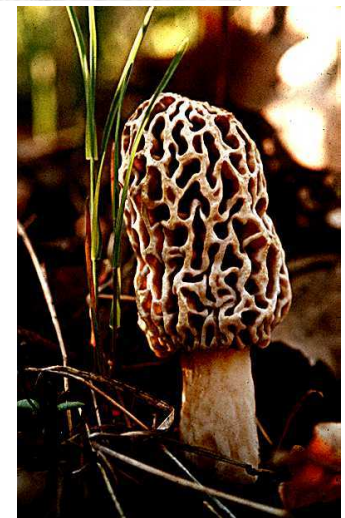
subphylum Saccharomycotina

- “true yeasts”
- some species with filamentous stages
- no sporocarps
- no ascogenous hyphae



subphylum Pezizomycotina (Euascomycetes)

- the ascocarp-forming Ascomycetes
- filamentous
- some species with yeast stages
- includes lichenized ascomycetes



Taphrinomycotina

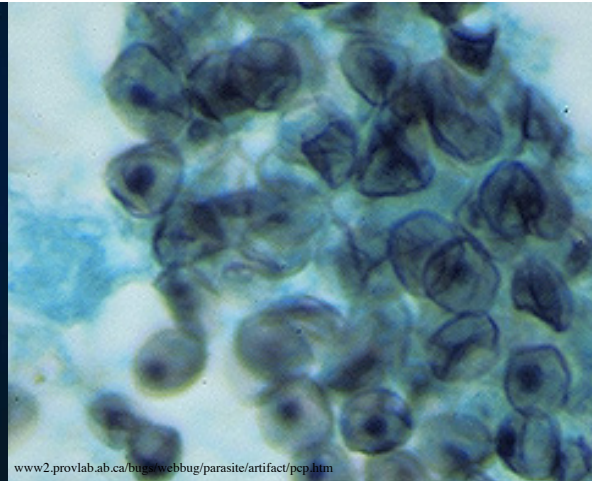
“Archeascomycetes”

- Taphrinales - *Taphrina deformans*
- Schizosaccharomycetales - *Schizosaccharomyces*
- Pneumocystidiales - *Pneumocystis*
- Neolectales - *Neolecta*



Schizosaccharomyces

Fission yeast cells stained with the DNA dye DAPI



Pneumocystis

www2.provlab.ab.ca/bugs/webbug/parasite/artifact/pcp.htm

Neolecta



Taphrina ascospores produce secondary spores by budding (blastospores). These are haploid, uninucleate.

Blastospores continue to bud on the host tissue in a yeast phase that can be cultured on artificial media.

Fusion of compatible mating types leads to formation of infective hyphae which are multinucleate, probably dikaryotic.

Infective mycelium does not penetrate far into host tissue, forms a subcuticular layer, ascogenous cells form.

As ascogenous cells elongate, the asci erupt through the host cuticle, forming a layer of superficial asci

Taphrina symptoms



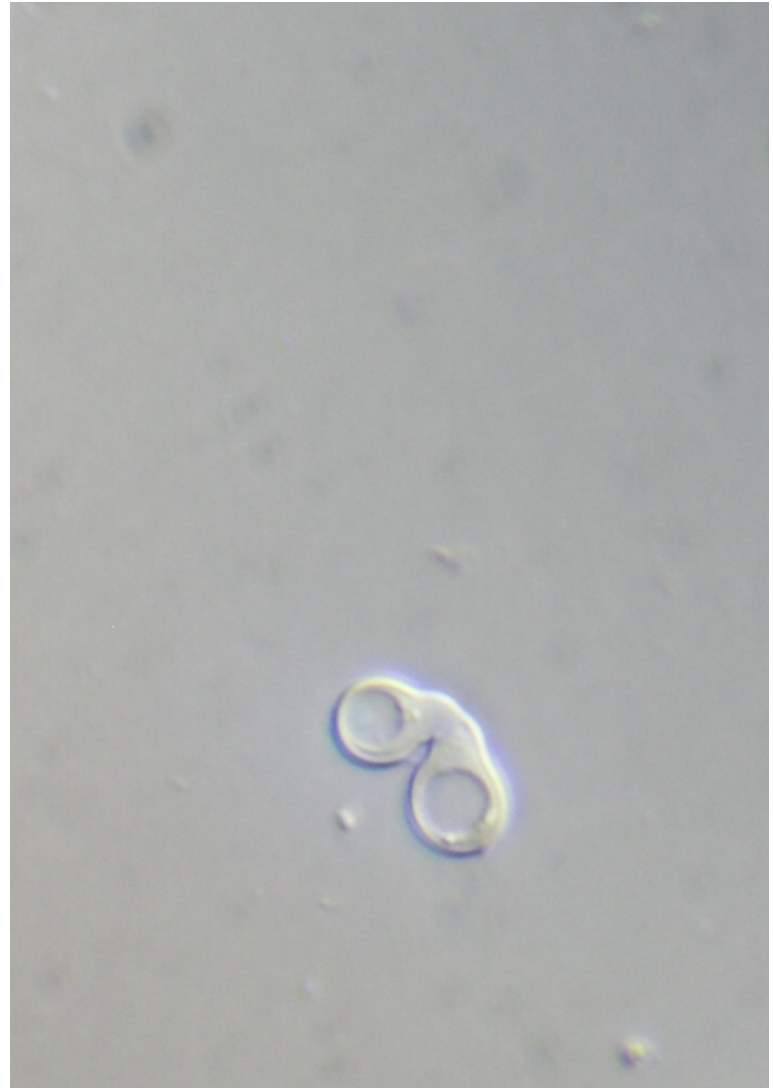
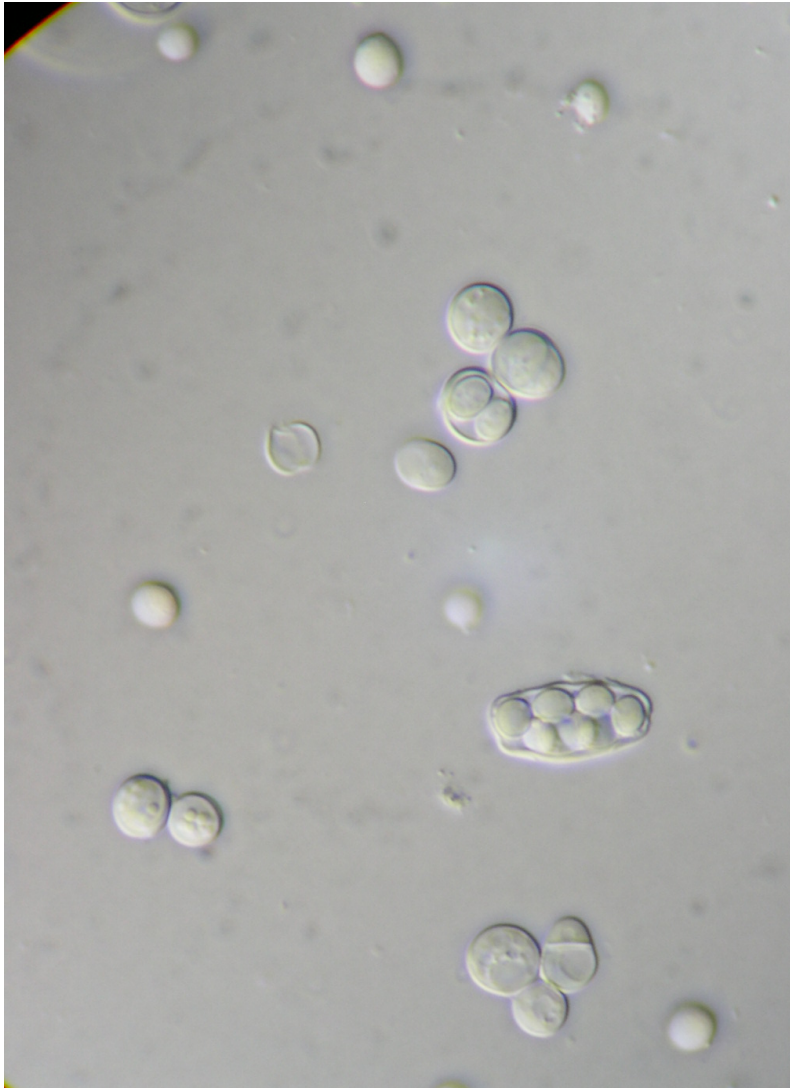


Schizosaccharomyces pombe
Fission yeast
From millet beer 'pombe'

Asci



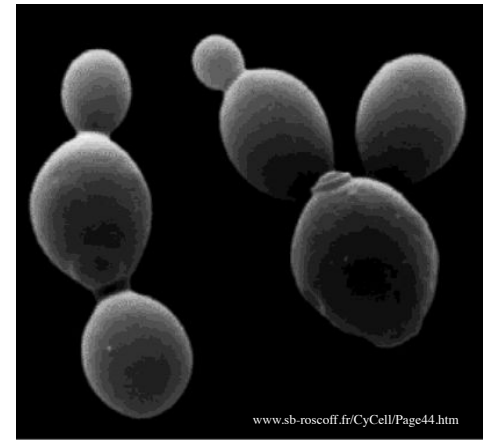
Schizosaccharomyces octospora



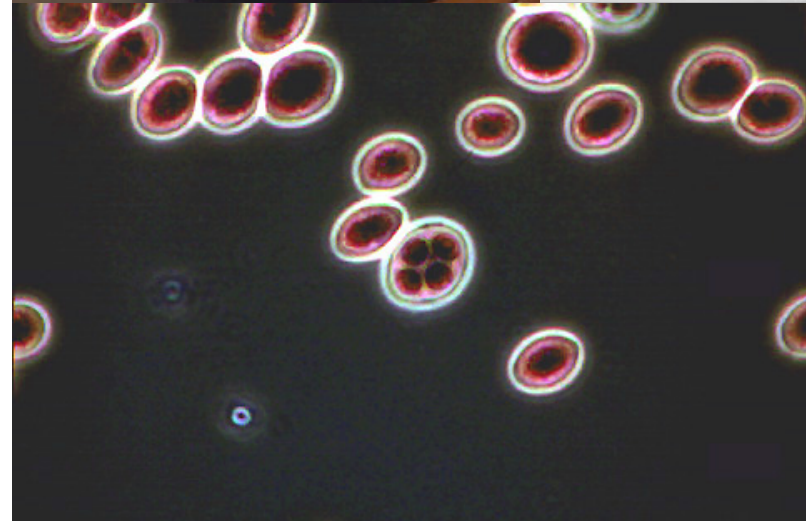
Saccharomycotina - “true yeasts”

Saccharomycetales

- budding yeasts
- *Saccharomyces cerevisiae*
 - brewer’s yeast
 - baker’s yeast
- *Candida albicans*
 - human pathogen
 - dimorphic
 - candidiasis, thrush
- no ascogenous hypha
- prototunicate asci



Yeast (*Saccharomyces cerevisiae*)



Saccharomyces life cycle

no dikaryon

may have extended diplophase

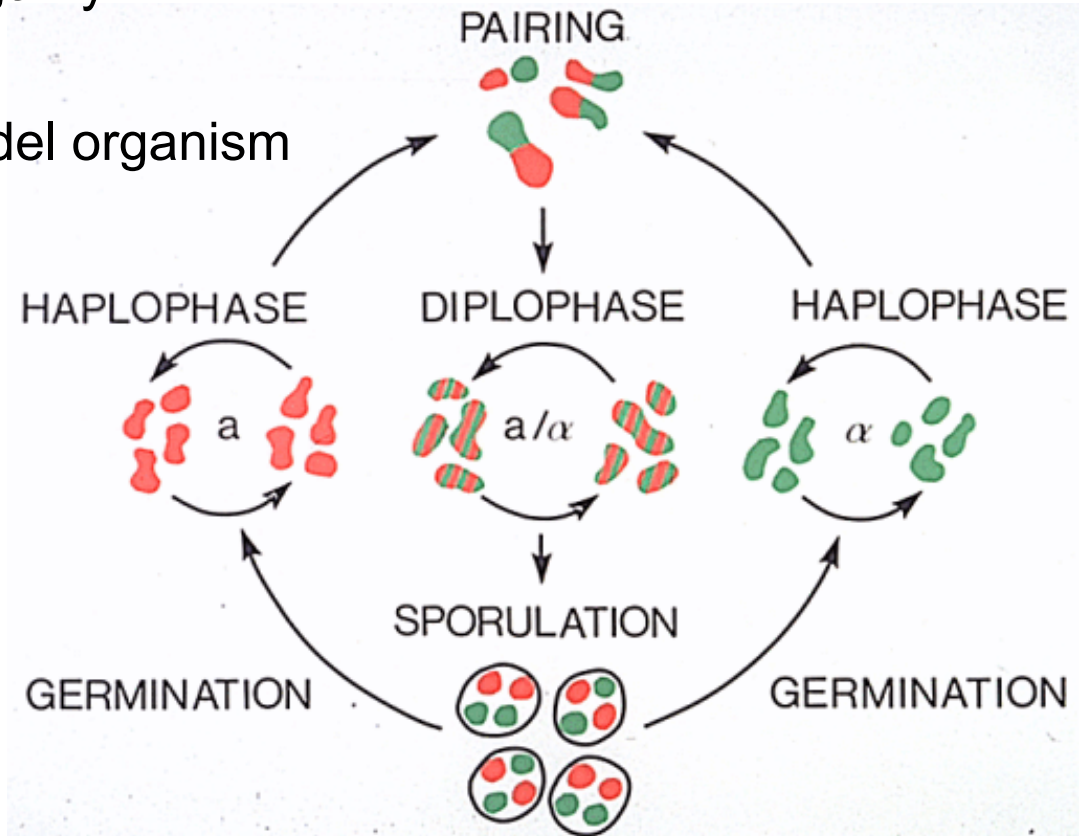
mating types a/α MAT operon

mating type loci encode peptide pheromones and receptors

binding of pheromones to receptors stops cell division

cells fuse, karyogamy

Eukaryotic genetics model organism



Pezizomycotina - the ascocarp-forming Ascomycetes

- ascogenous hyphae dikaryophase

- hymenium

“discomycetes” - apothecia

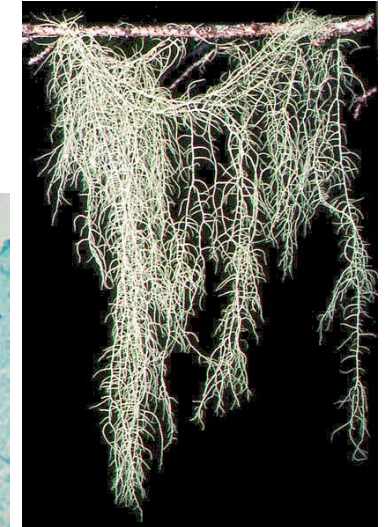
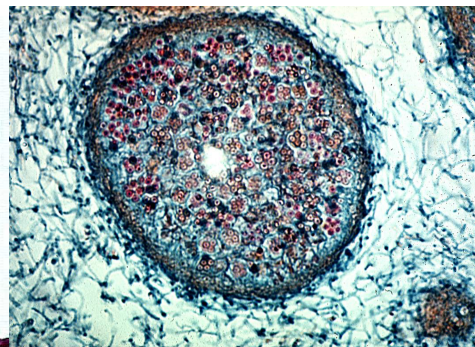
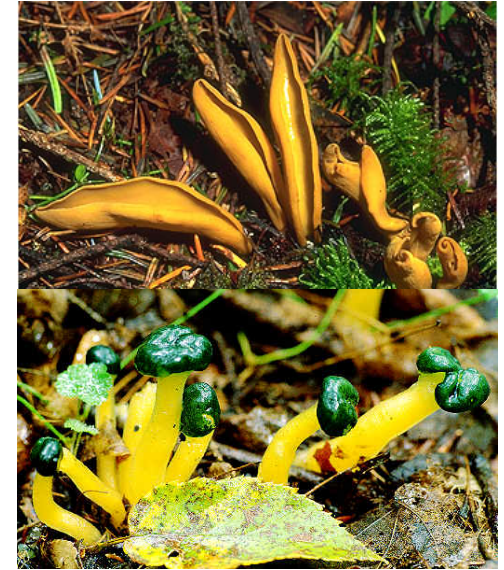
operculate discomycetes

inoperculate discomycetes

“pyrenomyces” - perithecia

“plectomyces” - cleistothecia

“loculoascomycetes” - pseudothecia



The Classes

Discomycetes
Pyrenomycetes
Plectomycetes
Loculoascomycetes

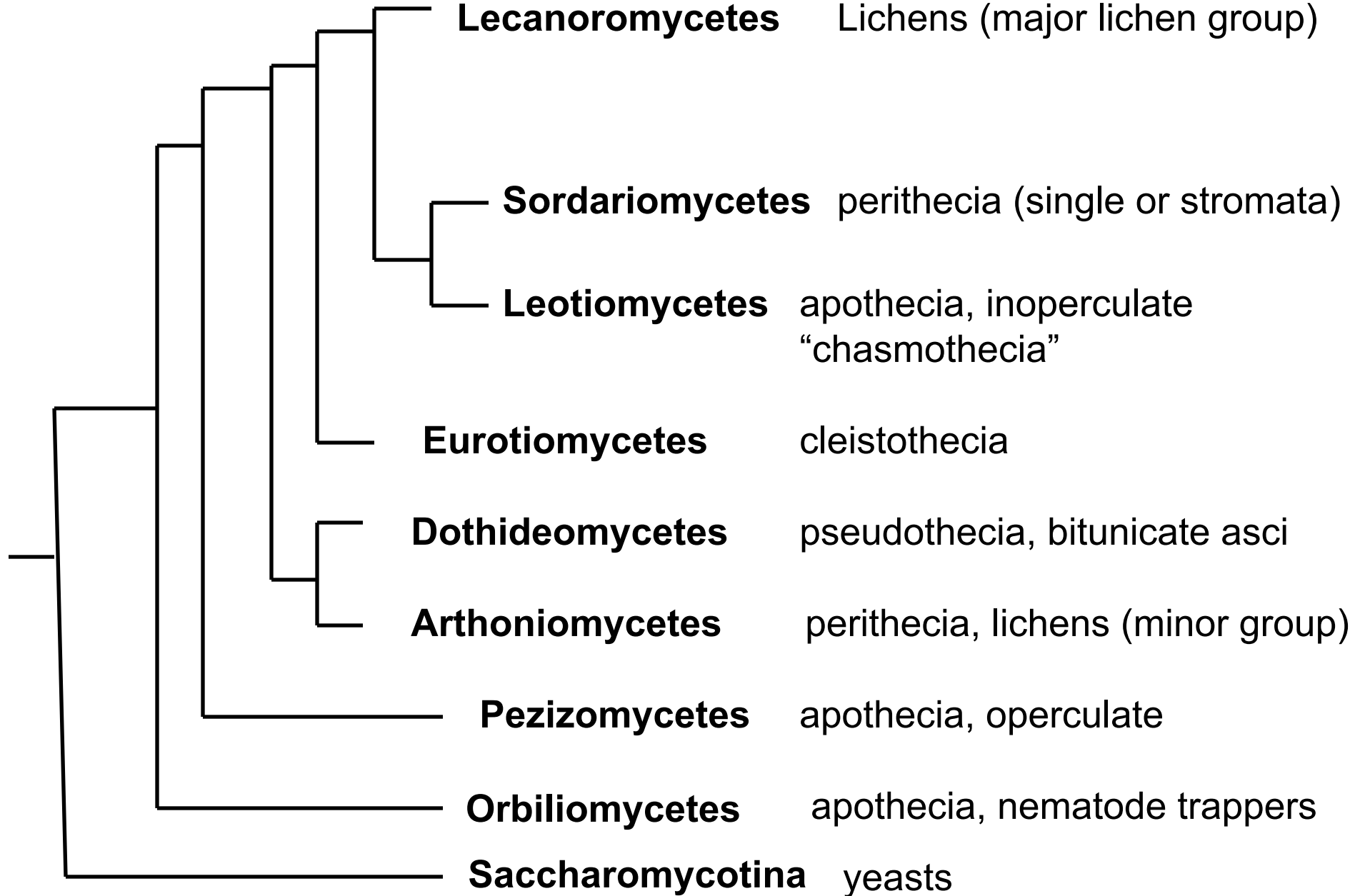
No longer considered legitimate taxa
Not monophyletic
Used informally

Classes of Pezizomycotina:

Obiliomycetes
Pezizomycetes
Sordariomycetes
Leotiomyces
Dothideomycetes
Eurotiomycetes
Lecanoromycetes



Pezizomycotina is the largest subphylum of Ascomycota

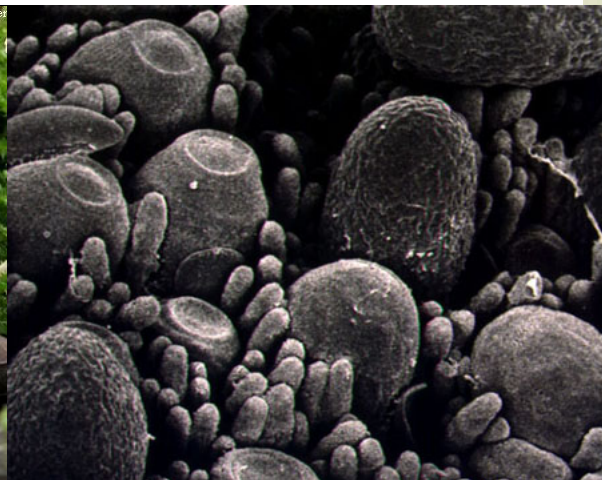


Classes of Pezizomycotina

Pezizomycetes

one Order, Pezizales
apothecial ascomata (exc. Tuber –
truffles)

Asci operculate (exc. Tuber)
ectomycorrhizal spp
ancestral group



Classes of Pezizomycotina

Orbiliomycetes

apothecial ascomata
inoperculate asci
nematode trappers, predators
saprobes
ancestral group

