



Session 1202: Basic Aeroallergen Course
Fungal Spore Morphology

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Disclosure

- No conflicts to disclose

Fungal Spore Characteristics

Characteristics

- Spore size
- Spore shape
- Number of cells
- Attachment Scars
- Wall characteristics
- Spore color

Spore Size, Shape, and Septation

- **SIZE:** 2 μ m to 100 μ m
- **SHAPE:** Globose, elliptical, fusiform, asymmetric, lemon-shaped, barrel-shaped, curved
- **SEPTATION:** Non-septate (one cell), single septum, transverse septa, transverse and longitudinal septa, random septa, pseudoseptate

Other Characteristics

- **ATTACHMENTS:** Attachment scars, attachment pegs
- **APPENDAGES**
- **WALL CHARACTERISTICS:** Smooth, granular, reticulate, spines, warts, wall thickness
- **COLOR:** Hyaline (colorless) to deeply pigmented

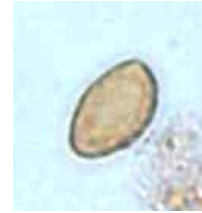
Globose



Barrel-shaped



Non-septate



Random septa



Lemon-shaped



Club-shaped



Transverse septa



Attachment scars



Elliptical



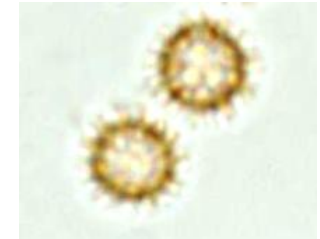
Curved



Transverse and Longitudinal septa



Ornaments: spines



Asymmetric and germ pore



Cylindrical



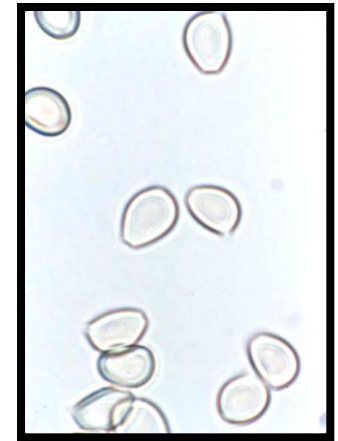
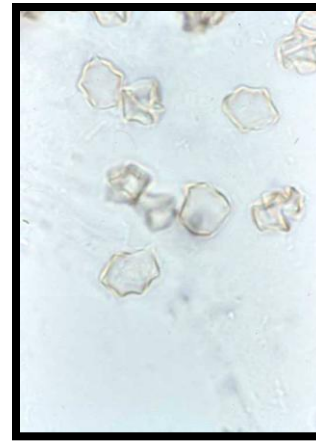
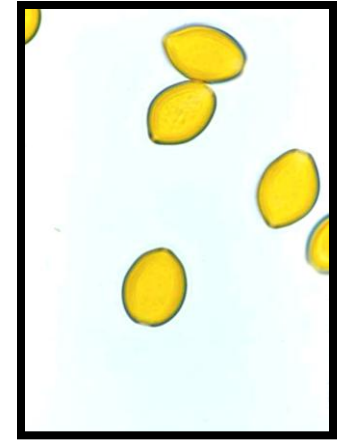
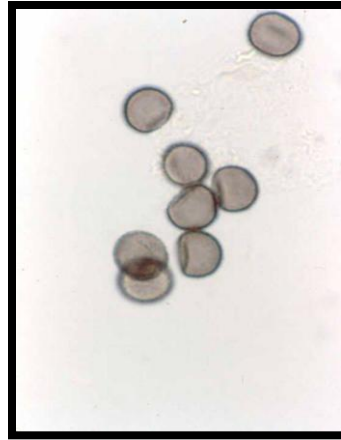
Pseudoseptate



Appendages



Spore color



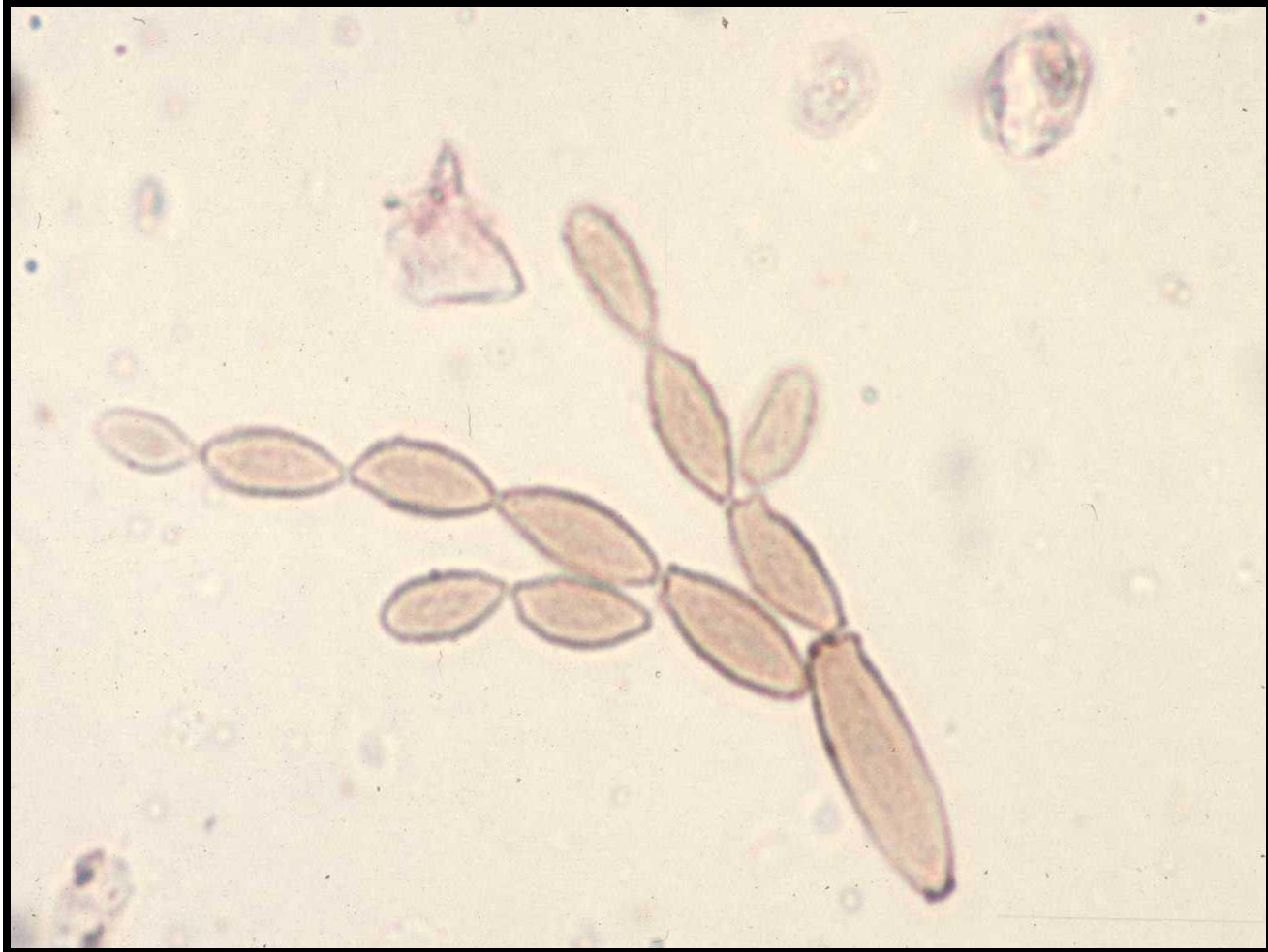
Asexual Spores

Also known as Deuteromycetes,
Fungi Imperfecti (imperfect fungi),
or Mitospores

Asexual Spores

- Typically the most abundant spores in the atmosphere
- Conidia often formed on specialized hyphae called conidiophores
- Asexual stage of ascomycetes
- Look for attachment scars where the spores were attached to the conidiophore or to each other

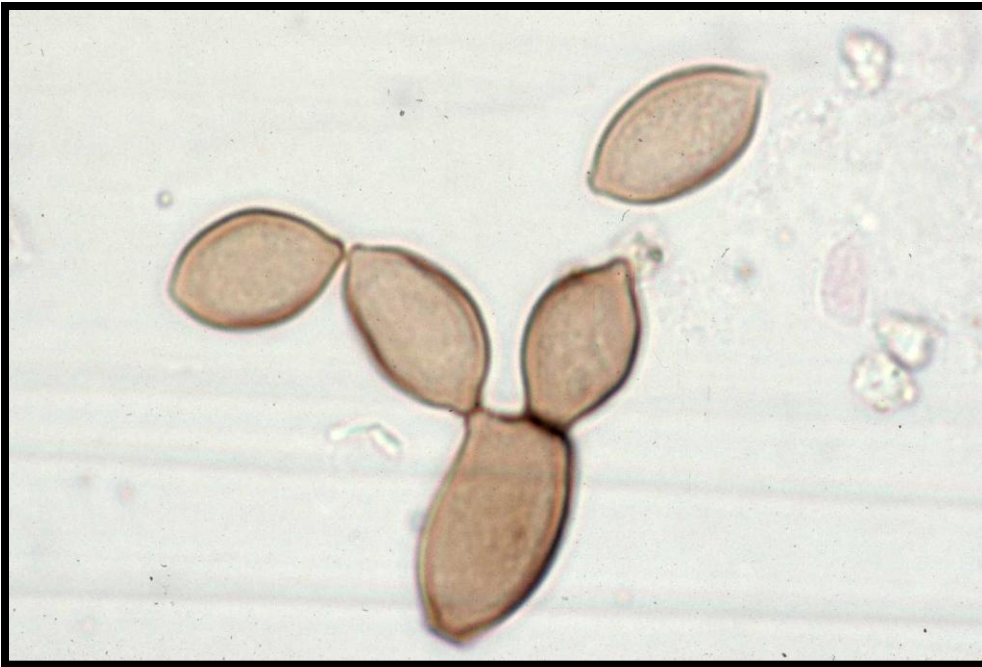
Cladosporium



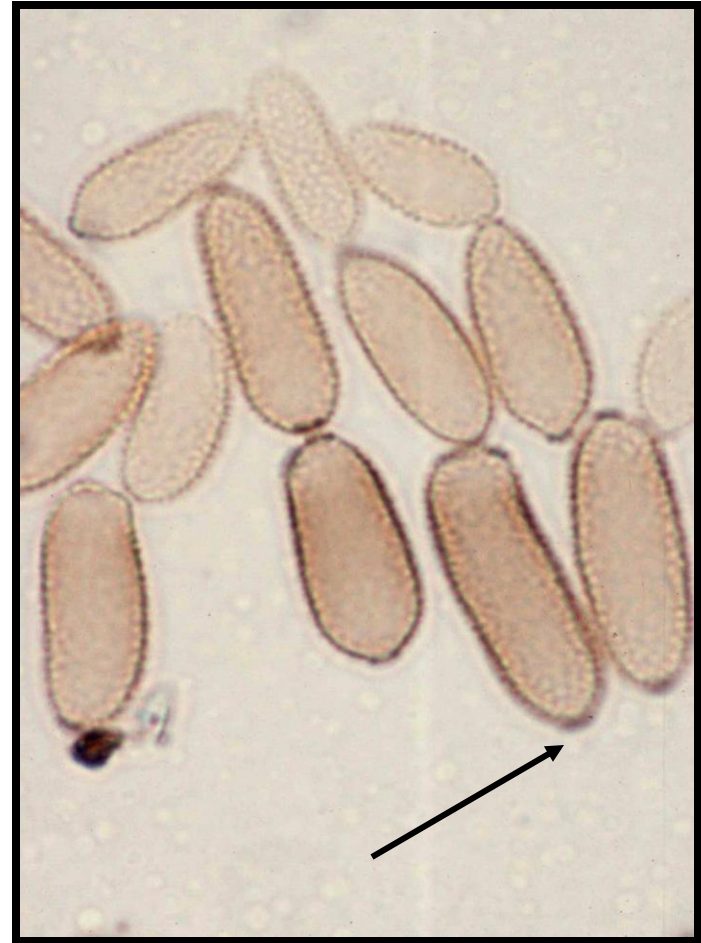
Cladosporium

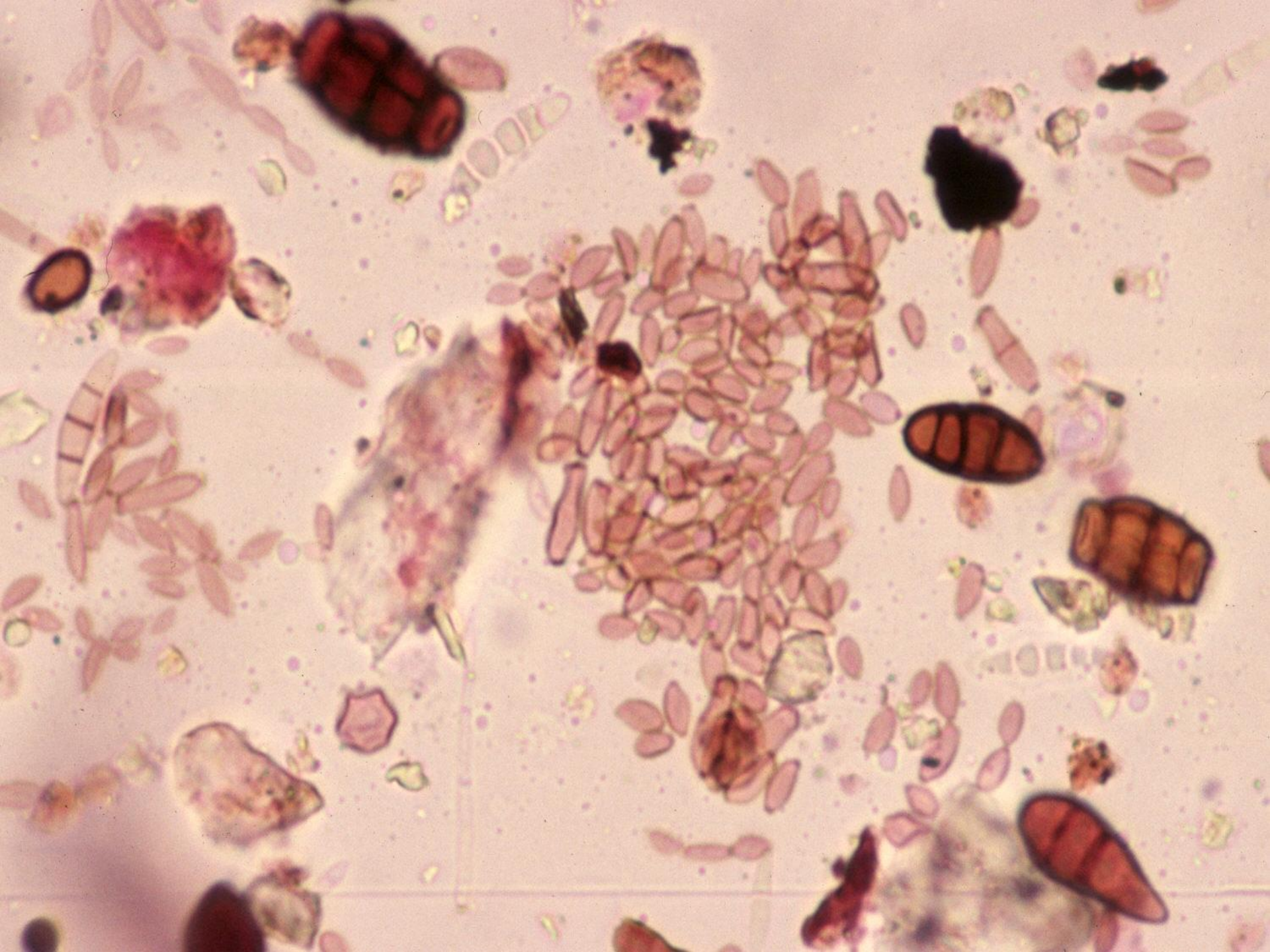


Several species of *Cladosporium*
are common in the atmosphere



Note the prominent attachment scars on *Cladosporium* conidia





Alternaria



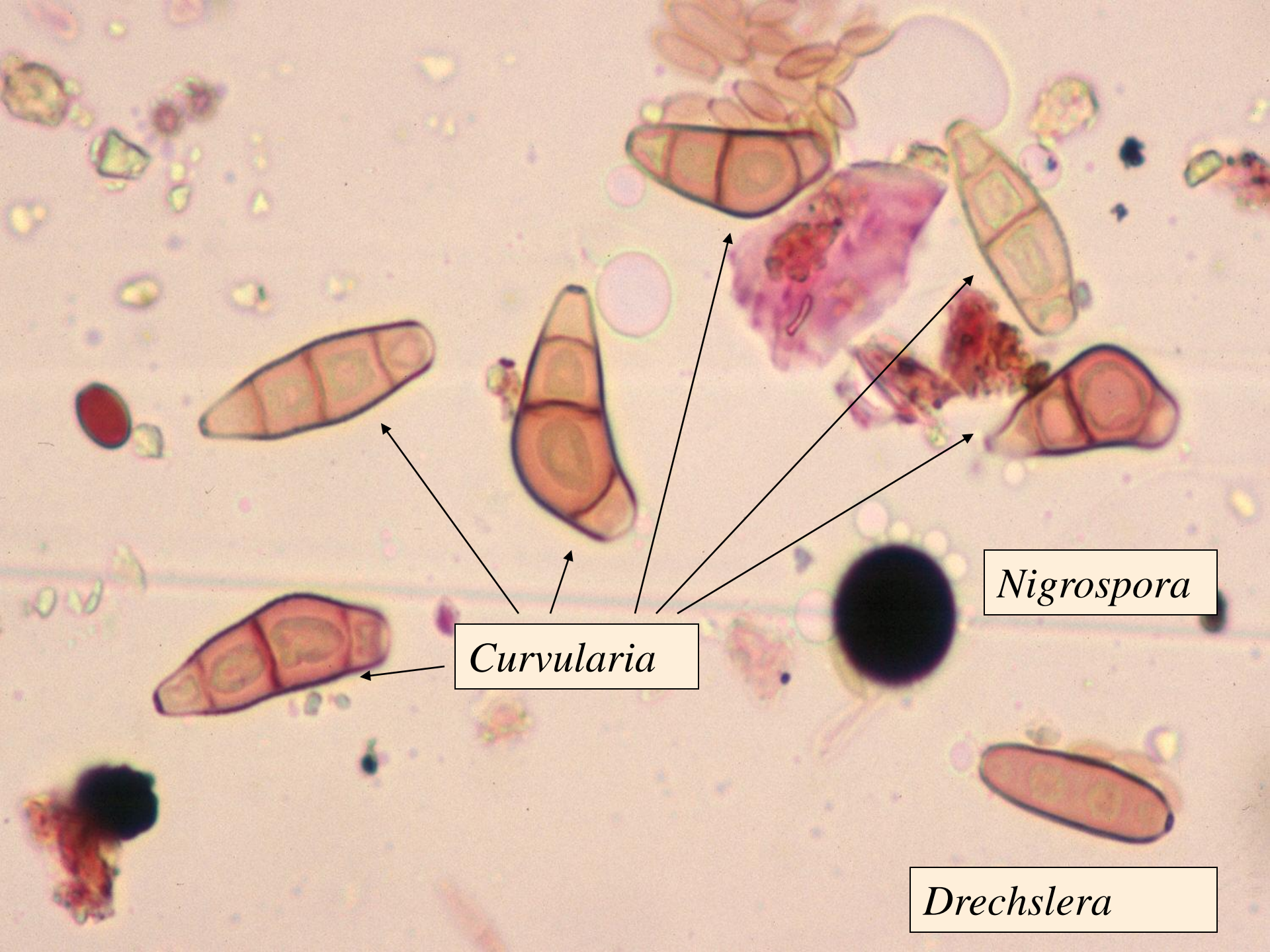
Alternaria







Curvularia



Curvularia

Nigrospora

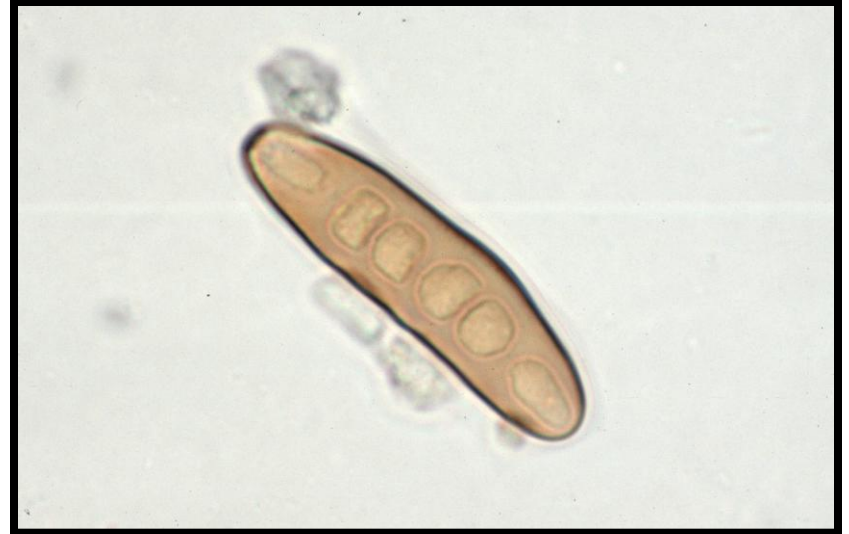
Drechslera

Drechslera-type spores

- Several genera of fungi have similar cylindrical spores
 - *Drechslera*
 - *Bipolaris*
 - *Exserohilum*
 - *Helminthosporium*



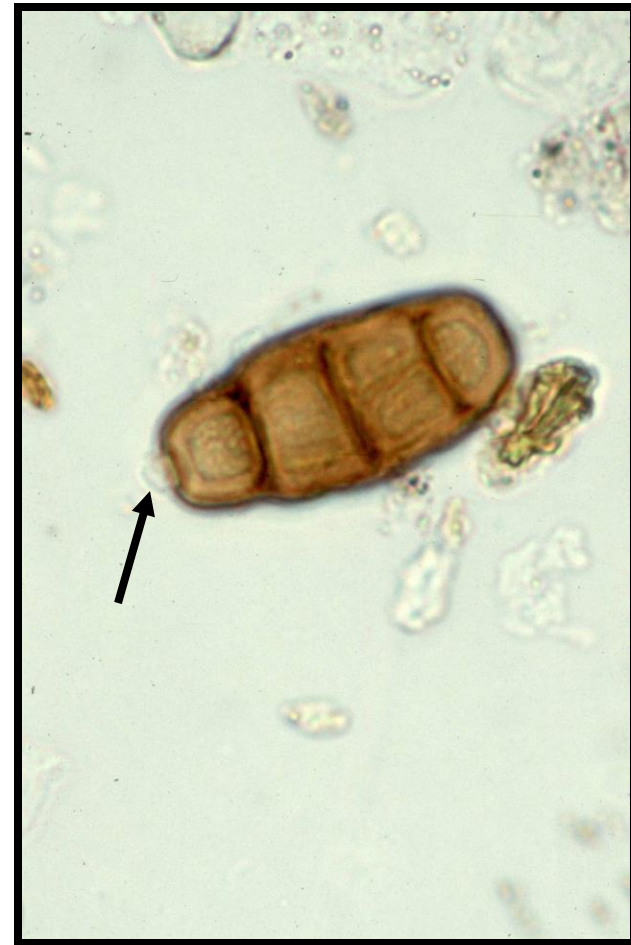
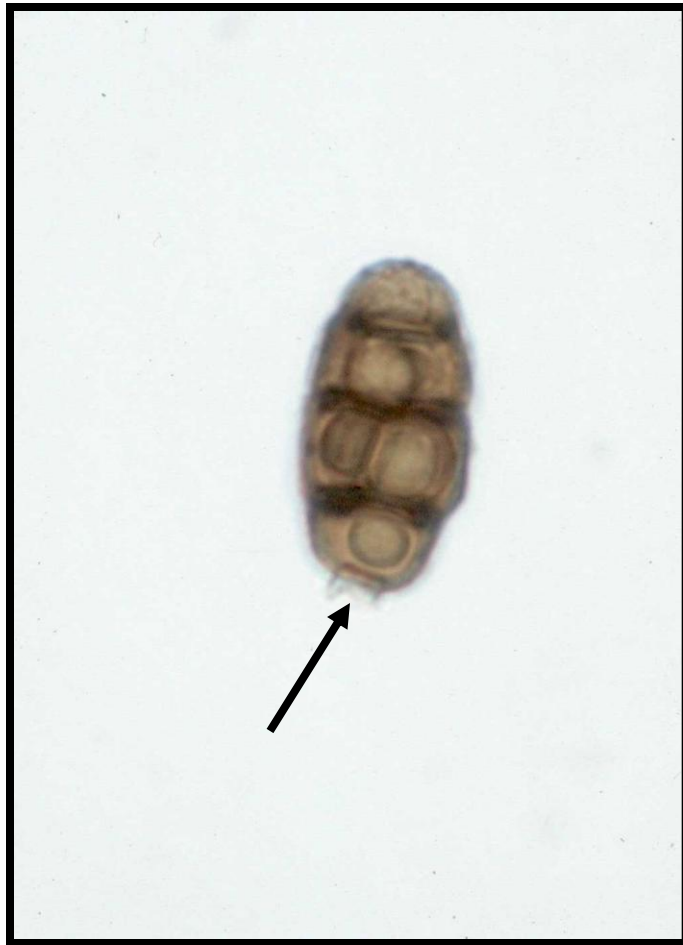
Drechslera-type spores



Pithomyces



Note the colorless attachment at the base of *Pithomyces* spores



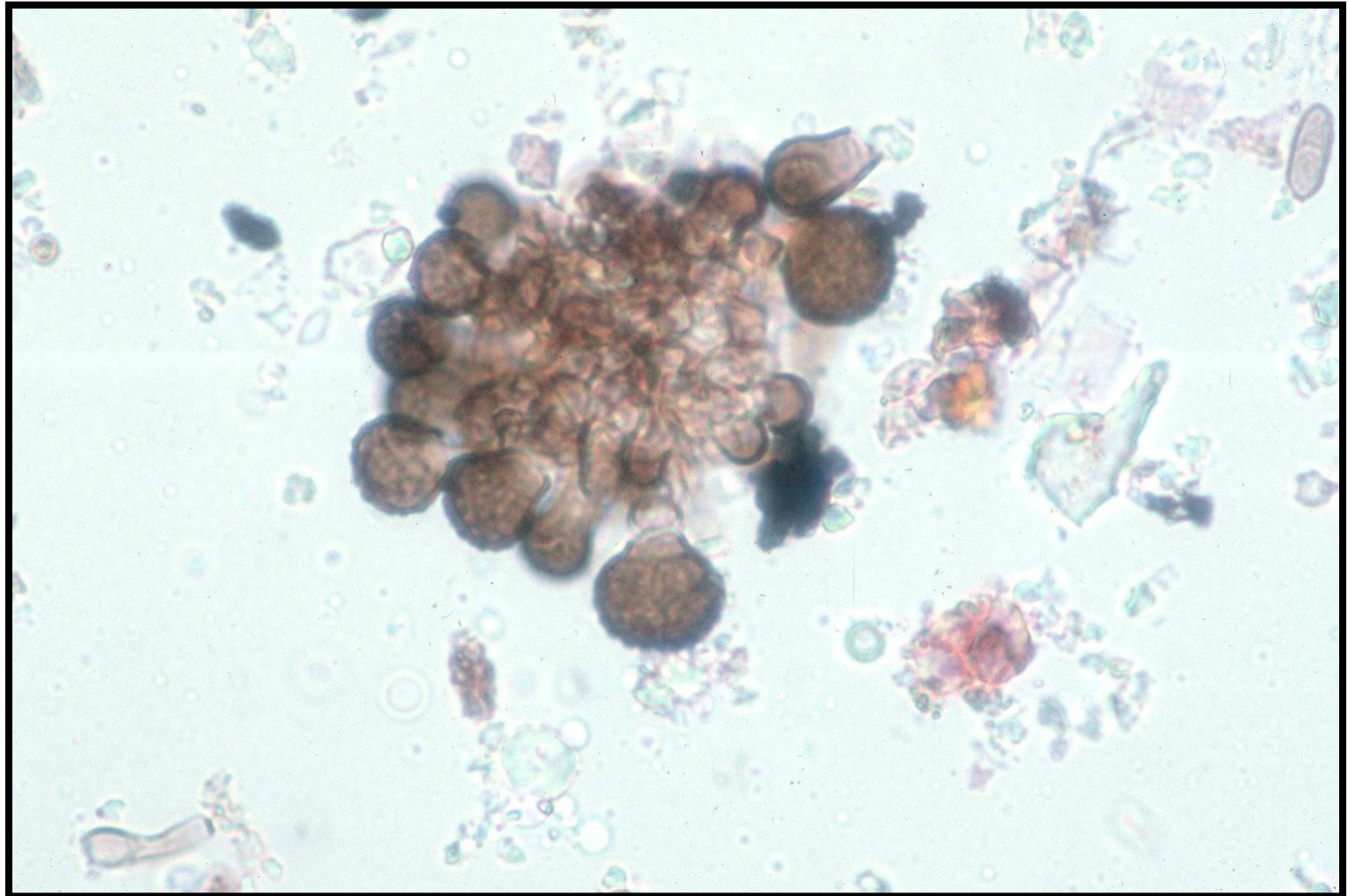


Pithomyces in culture

Epicoccum



Epicoccum spore cluster (sporodochium)

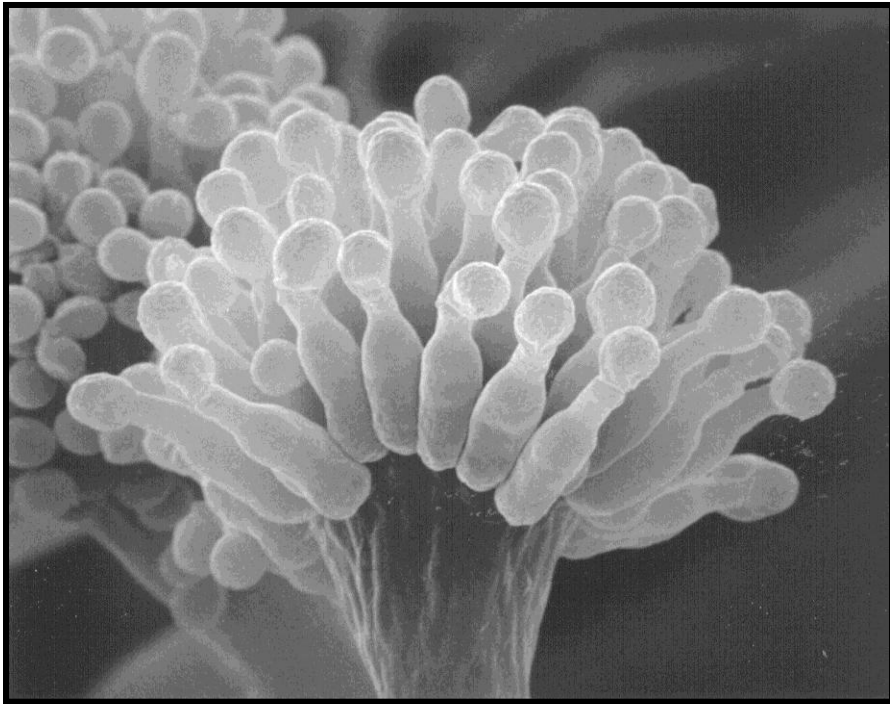


Penicillium species

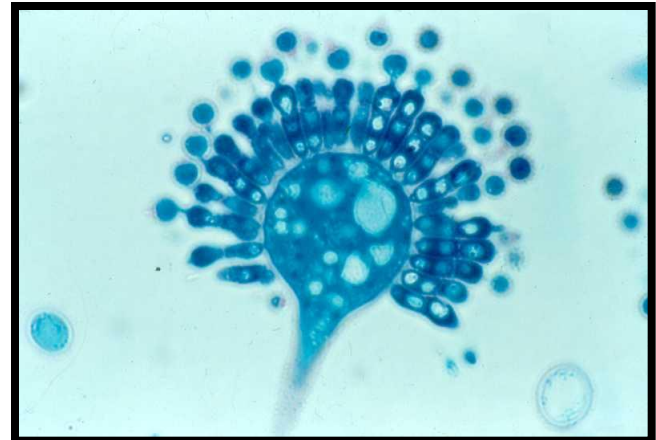
- Produce distinctive conidiophores (spore bearing structures)
- Spores are usually spherical to oval and form in chains



Aspergillus species



- Produce distinctive conidiophores (spore bearing structures)
- Spores are usually spherical to oval and form in chains



Penicillium-Aspergillus type spores



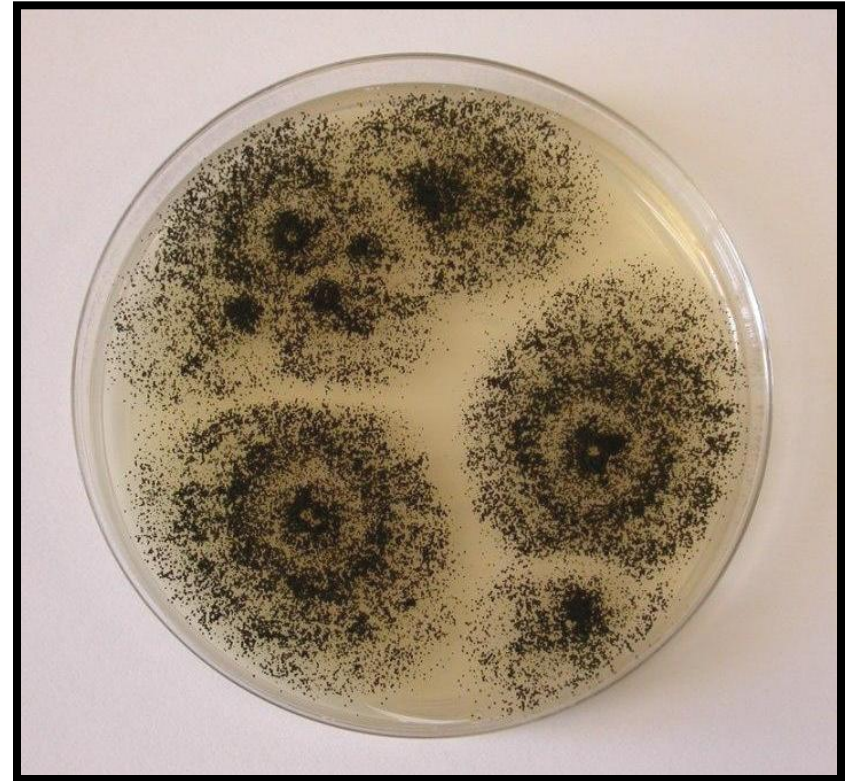
Penicillium-Aspergillus type spores



Aspergillus niger spores



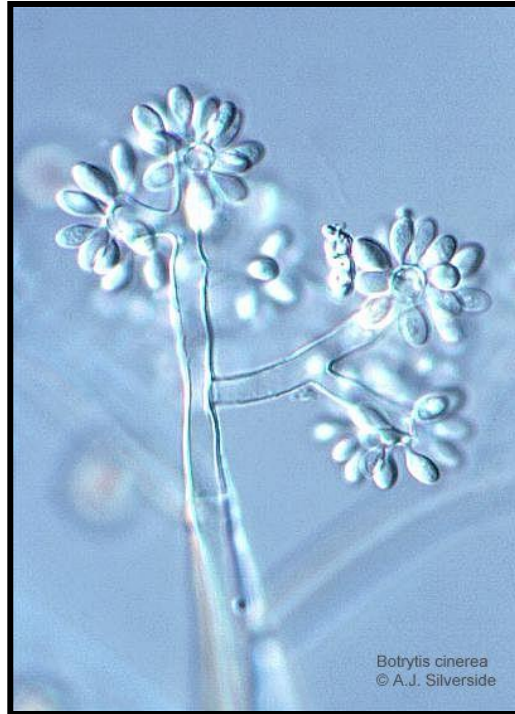
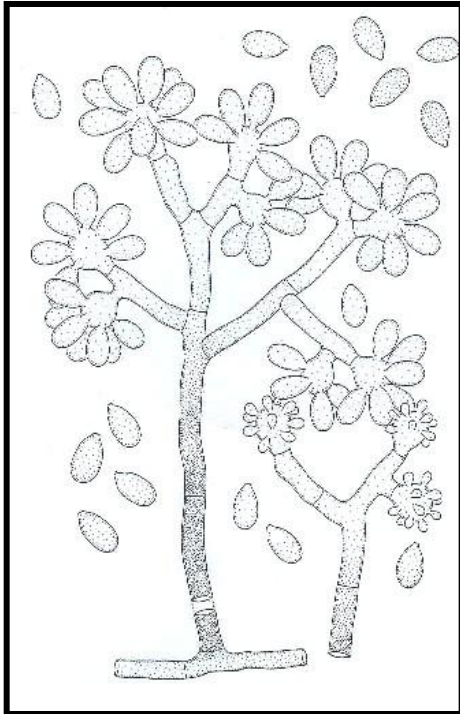
Aspergillus niger in culture



Fusarium



Botrytis



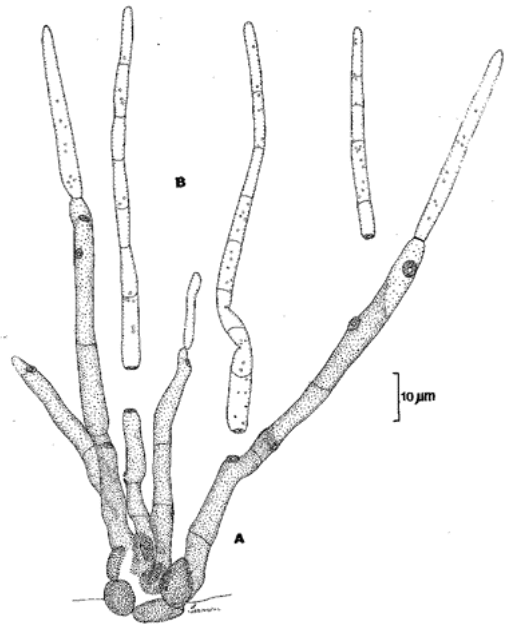
Oidium



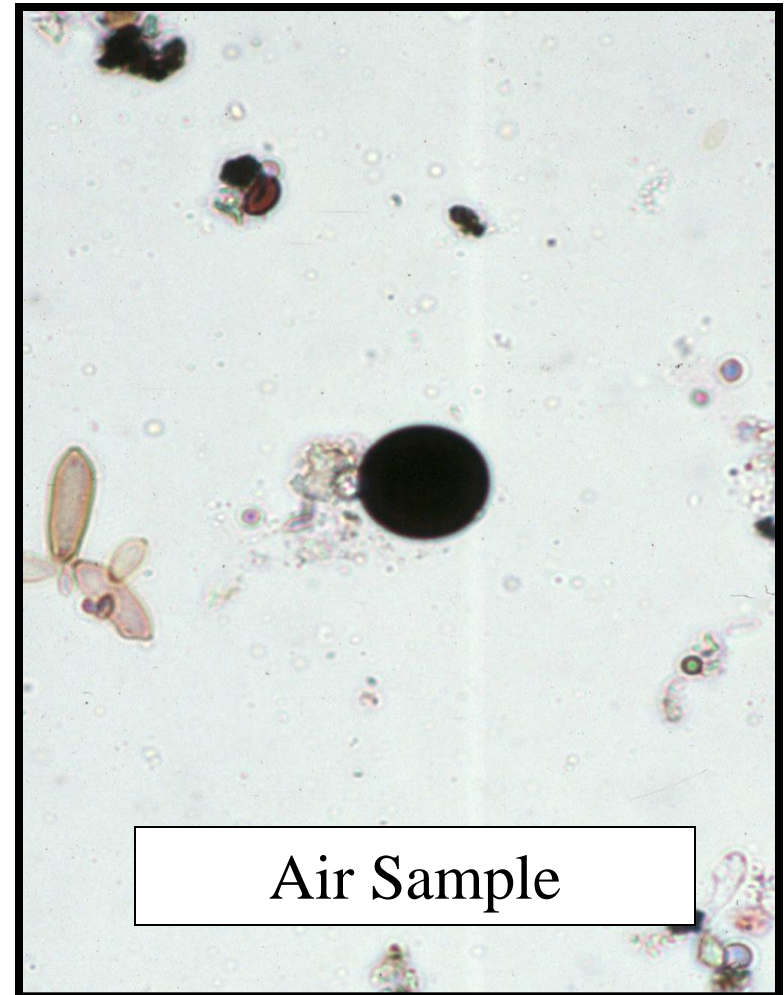
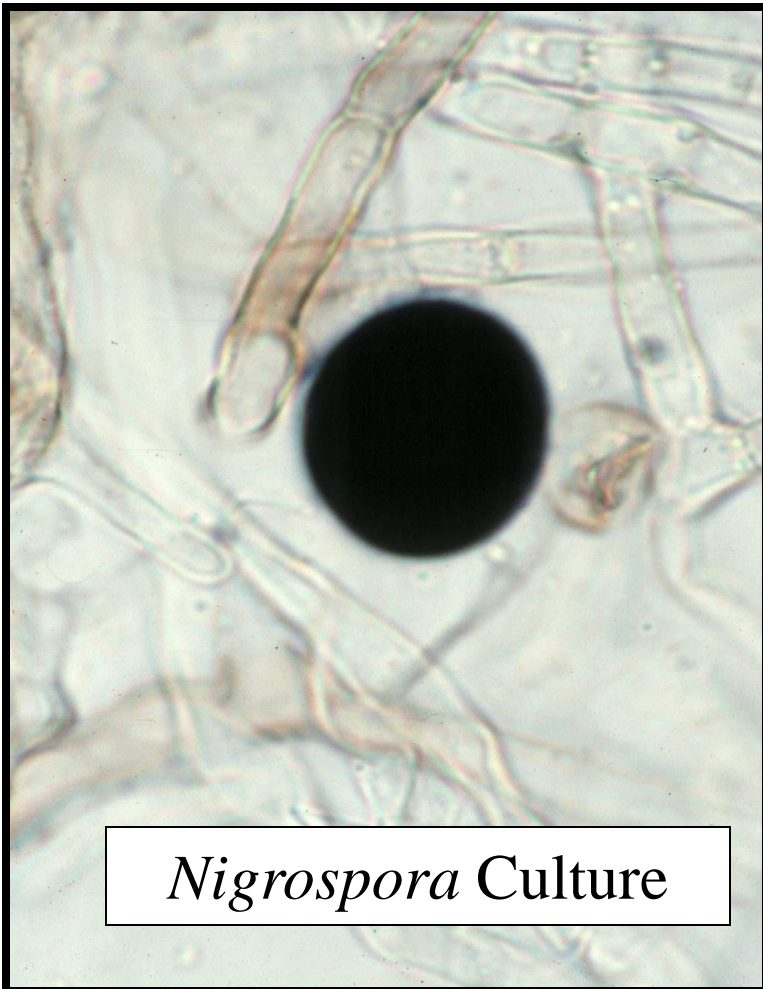
The background of the slide is a microscopic image showing a variety of asexual spores. There are numerous small, round spores, some with clear outlines and others with more complex internal structures. Some spores are elongated and have a distinct pattern of dark lines or bands. One prominent spore in the upper left is a large, dark red, roughly spherical structure. The overall appearance is that of a diverse collection of microbial spores, typical of what might be found on a NAB Count sheet.

Other Asexual Spores on the
NAB Count sheet

Cercospora



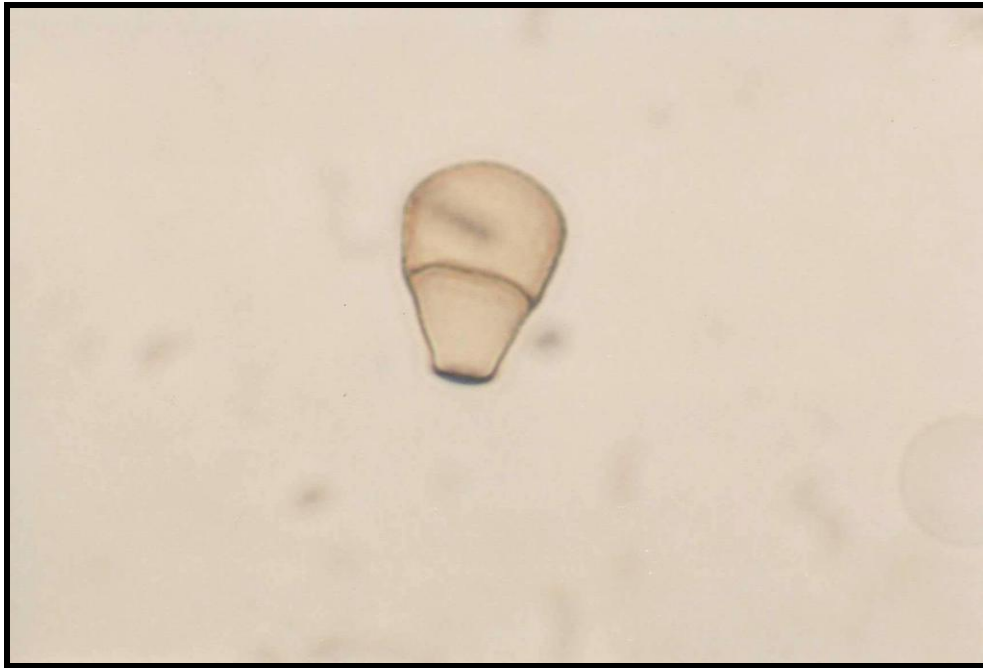
Nigrospora



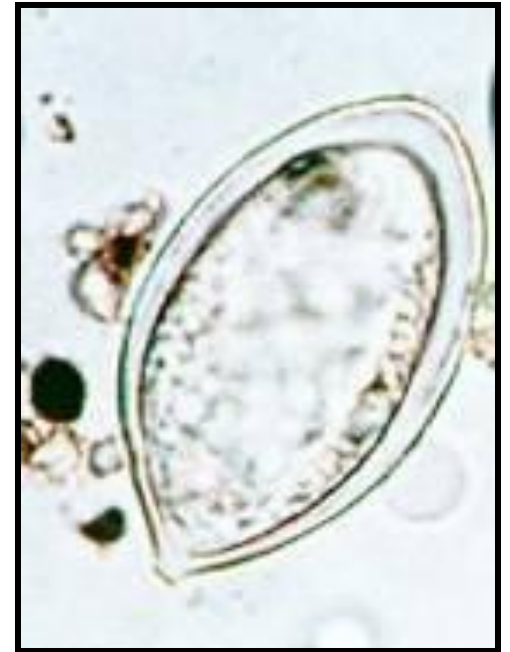
Periconia



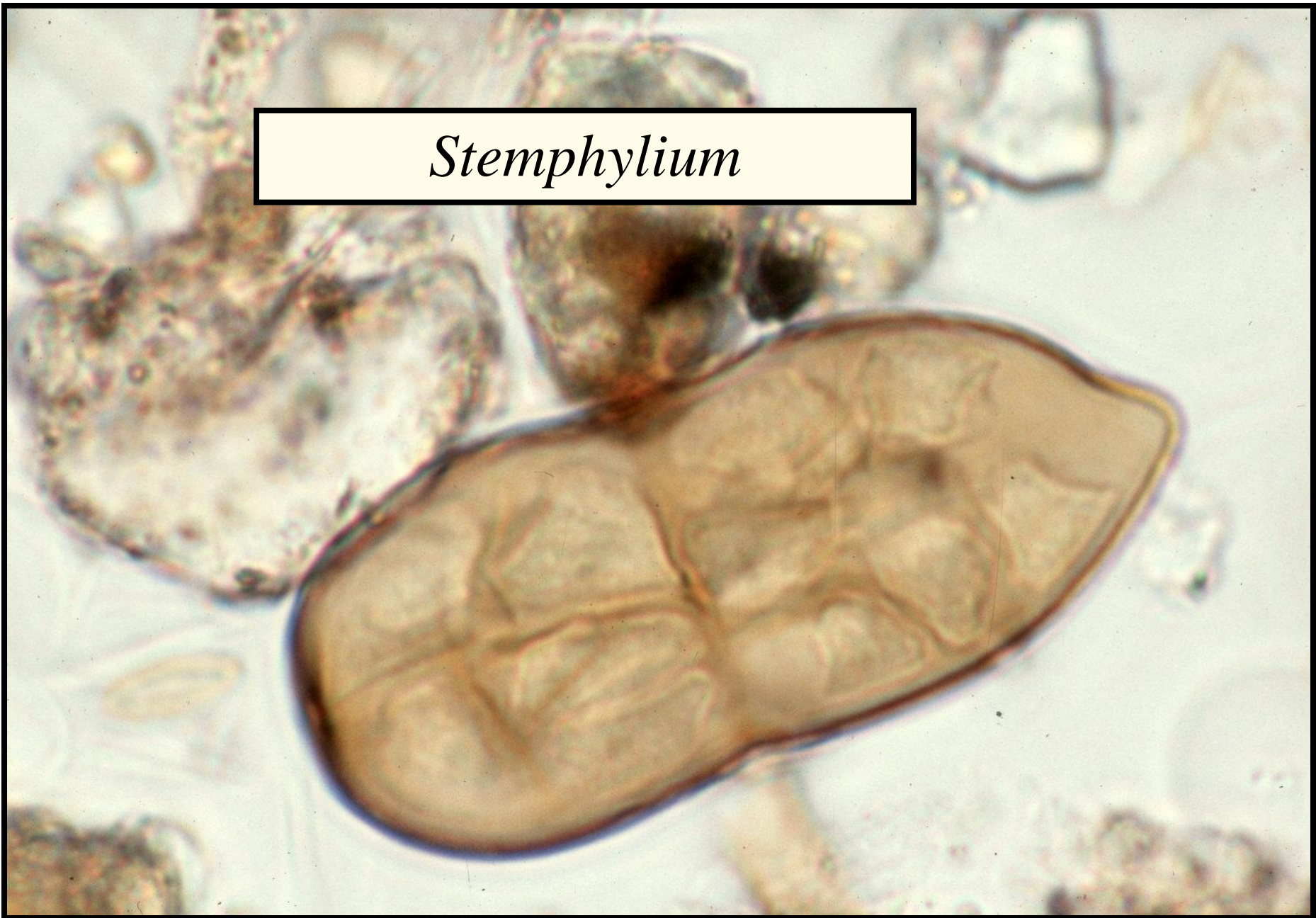
Polythrincium



Peronospora



Stemphylium



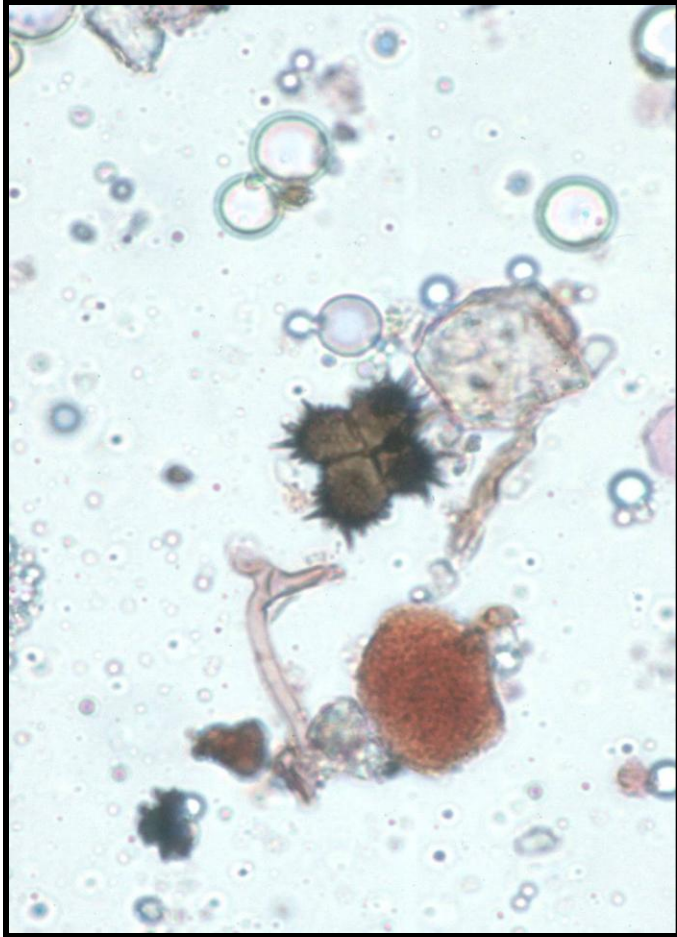


Torula



Other Asexual Spores NOT on
the NAB Count Sheet

Spegazzinia



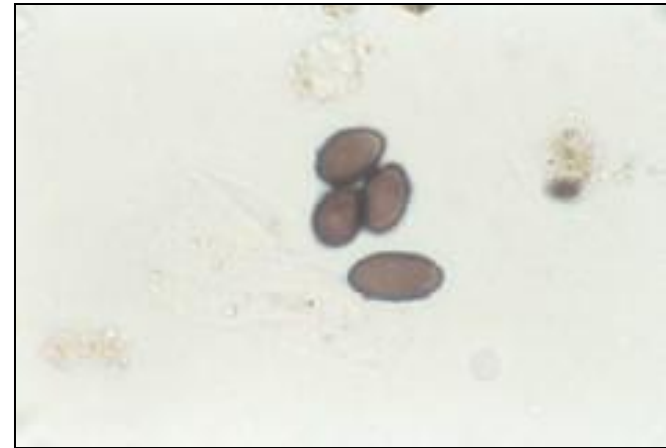
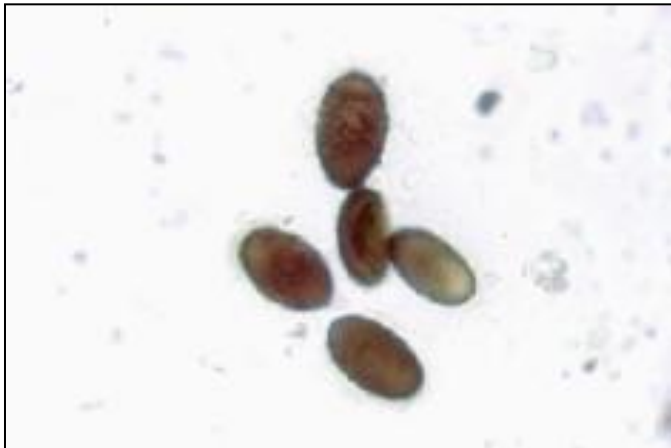
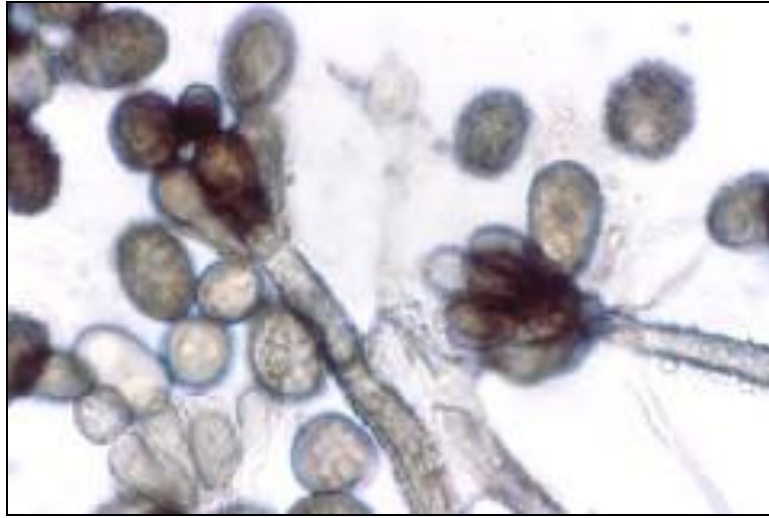


Tetraploa



Pestalotiopsis

Stachybotrys



Division Ascomycota



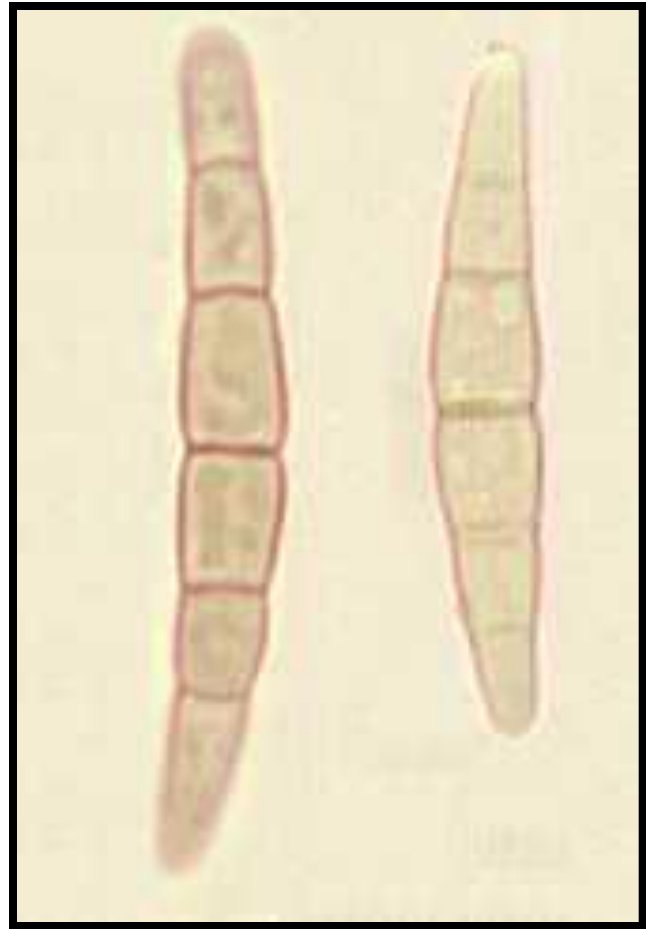
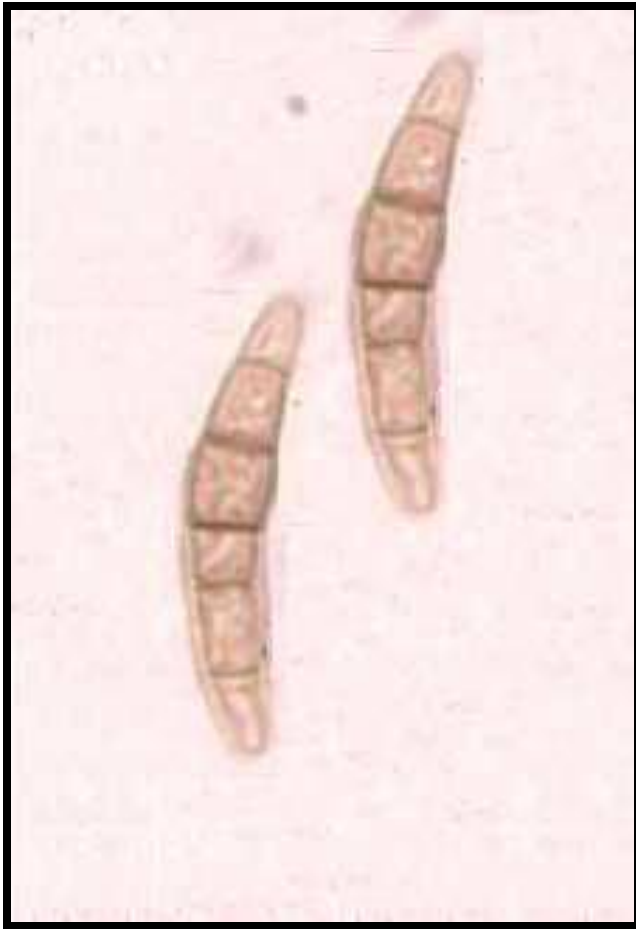
Eight ascospores are produced in each ascus without any attachment scars



Ascospores are sometimes found in groups of eight in air samples



****Leptosphaeria* ascospores**



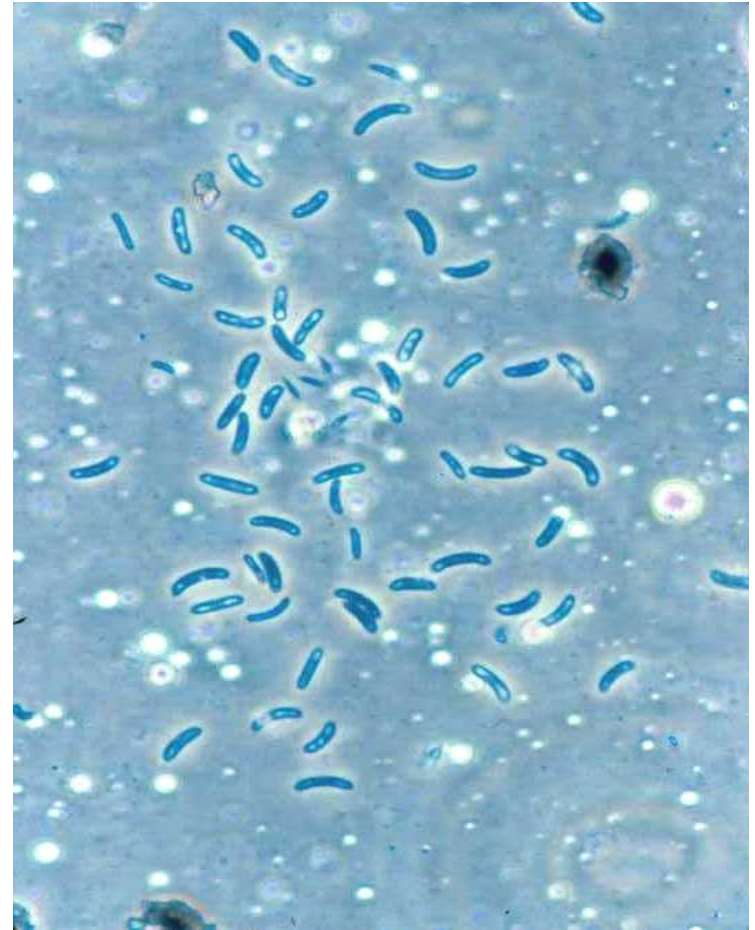
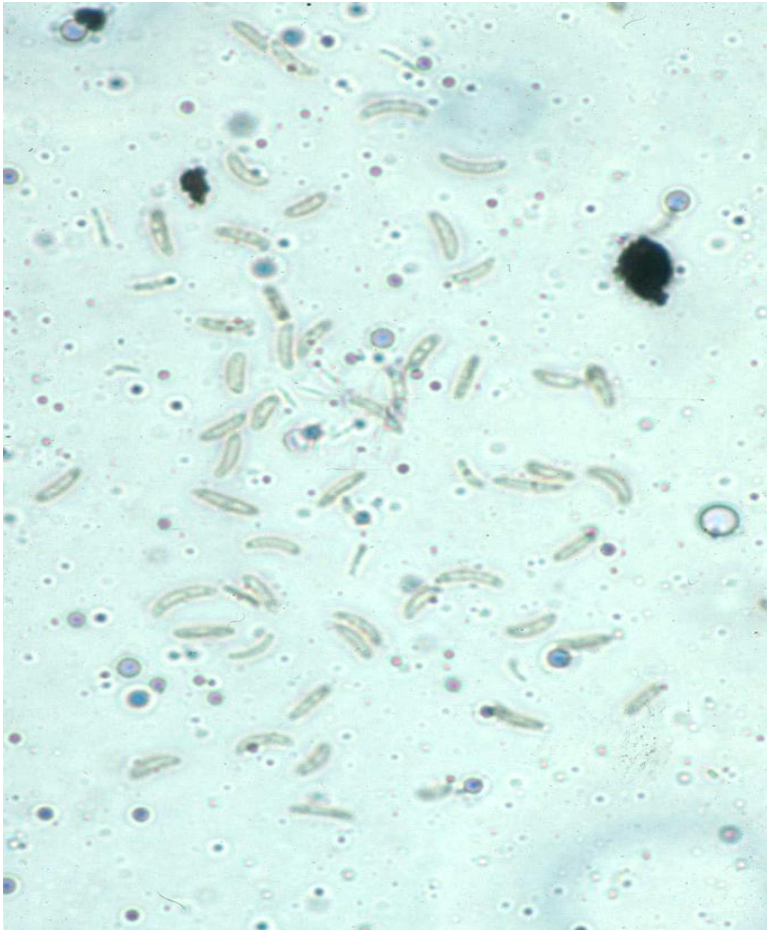
**Chaetomium* ascospores



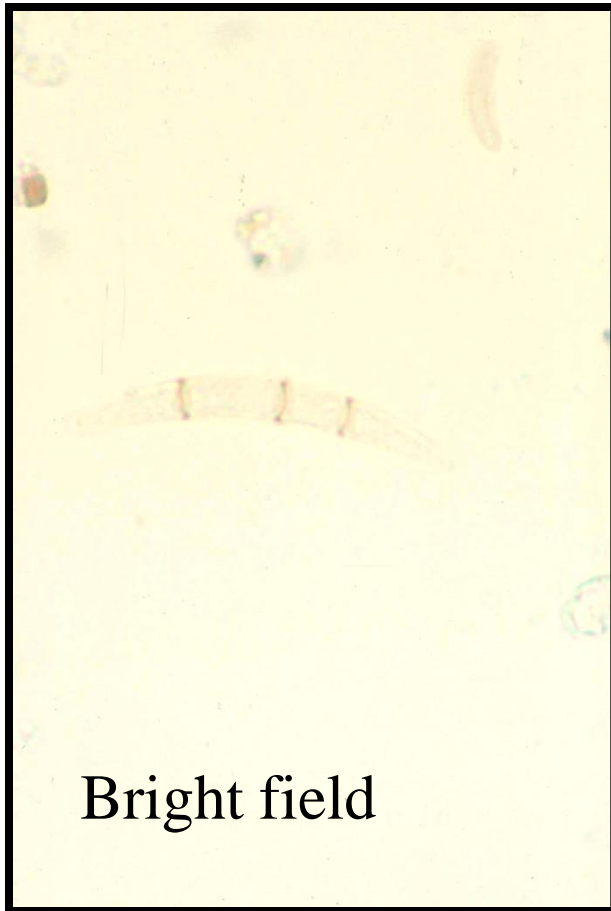
**Pleospora*
ascospores



Diatrypella ascospores
(*Family Diatrypaceae)



Phaeosphaeria annulata



Sporormiella ascospores



Venturia ascospores



Paraphaeosphaeria ascospore



Leptosphaerulina ascospore



Various ascospores

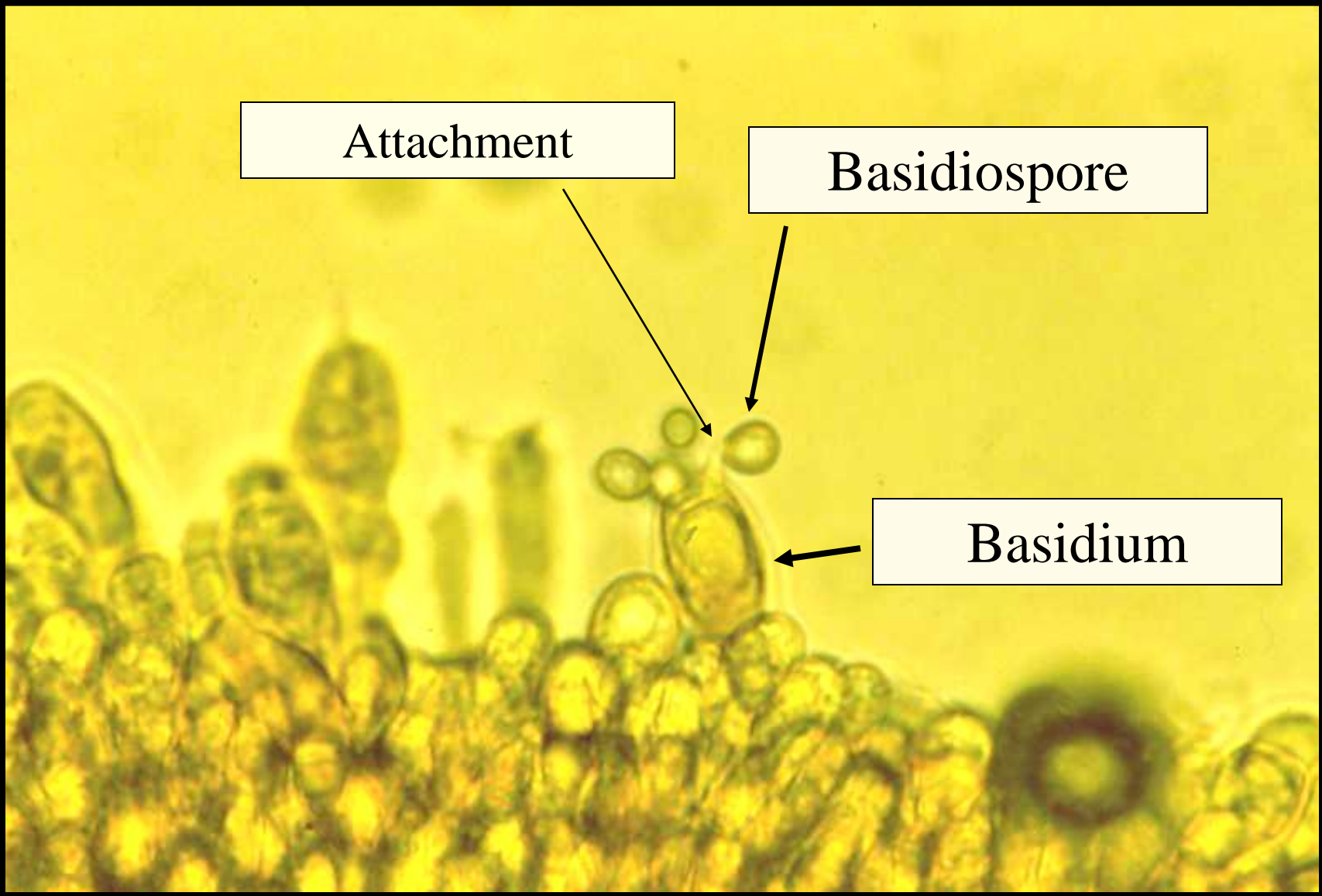


Many ascospores on a rainy day



Division Basidiomycota





Attachment

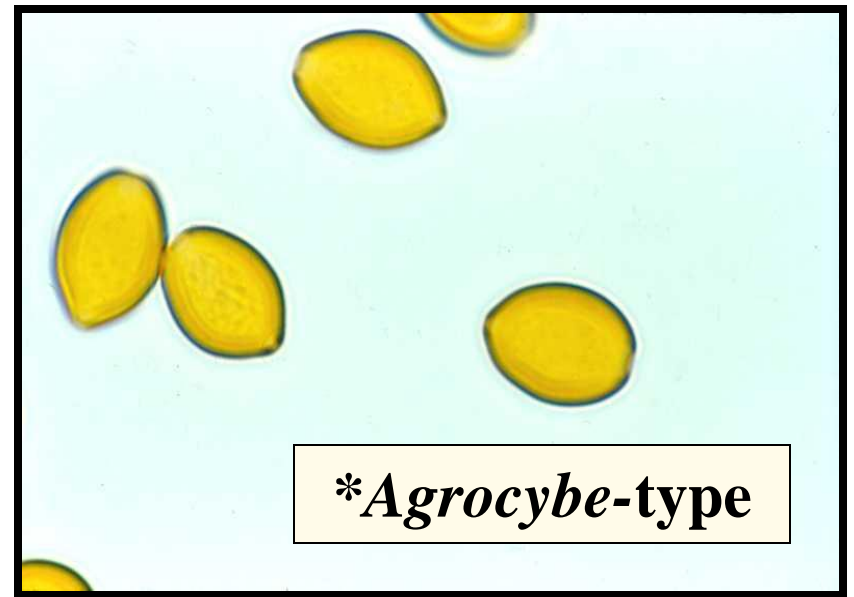
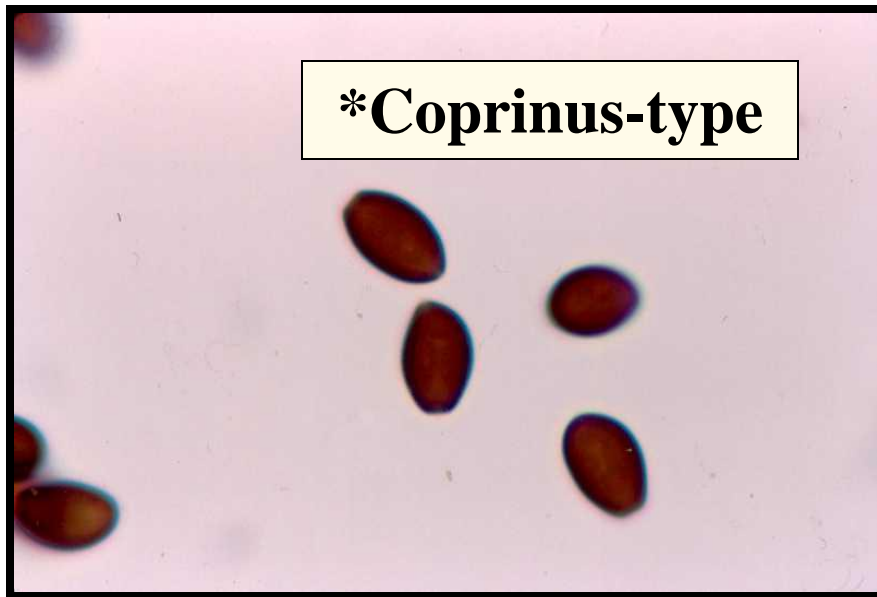
Basidiospore

Basidium

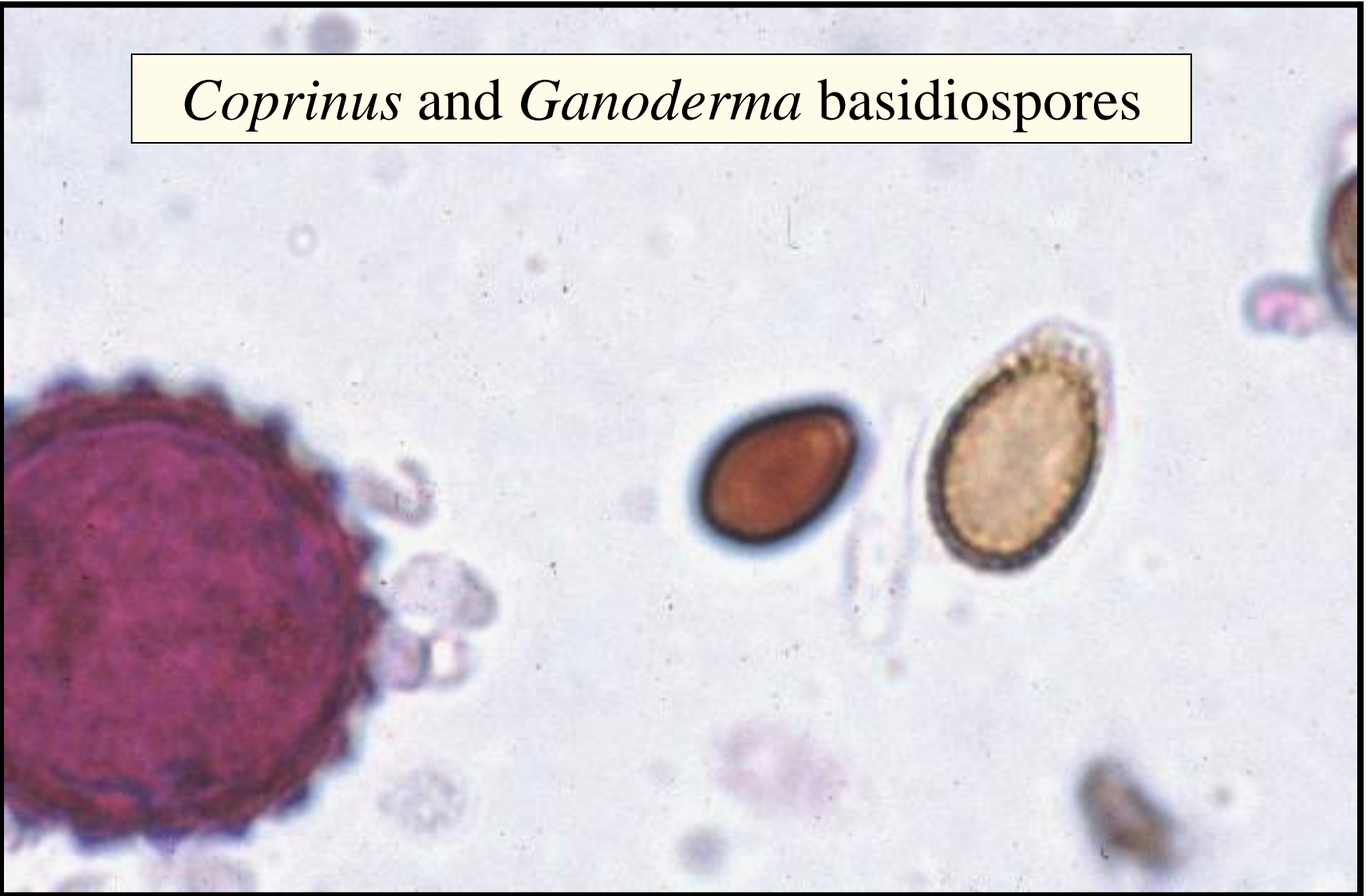
**Ganoderma* basidiospores



Other basidiospores that are easy to recognize



Coprinus and *Ganoderma* basidiospores



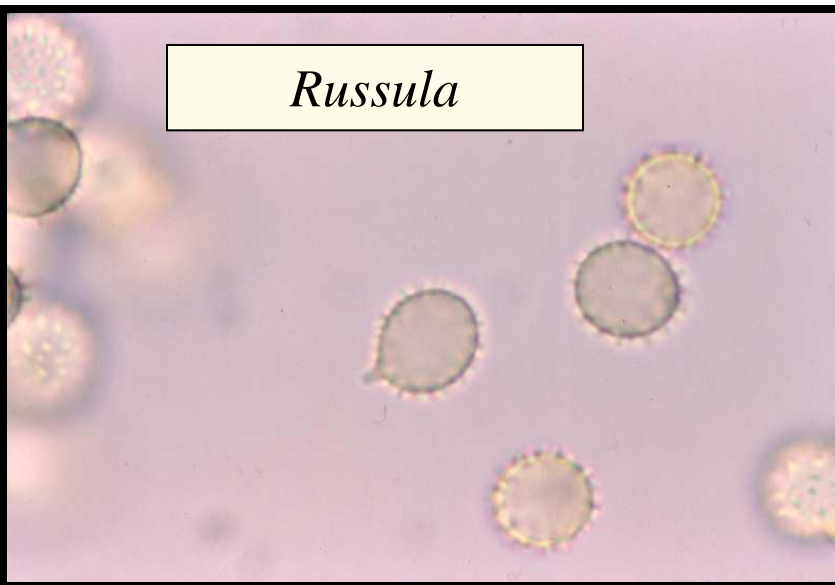
Psathyrella



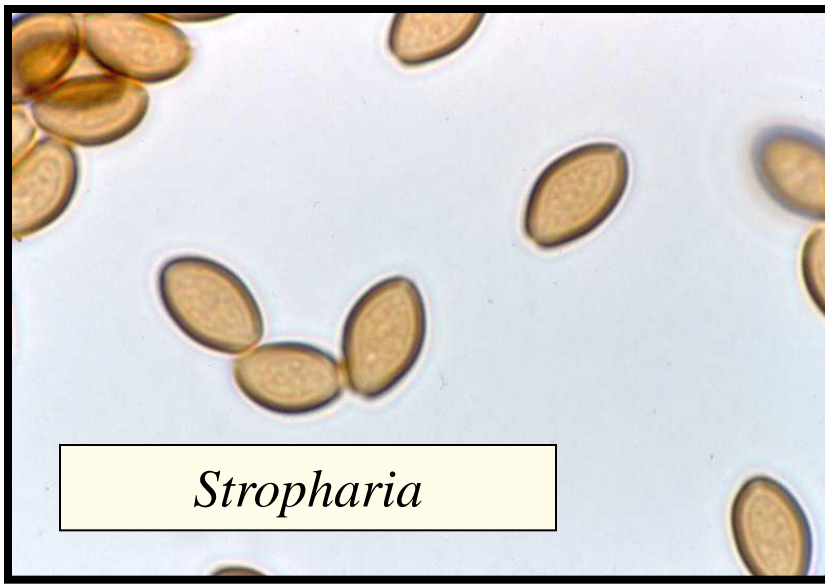
Psathyrella velutina



Russula



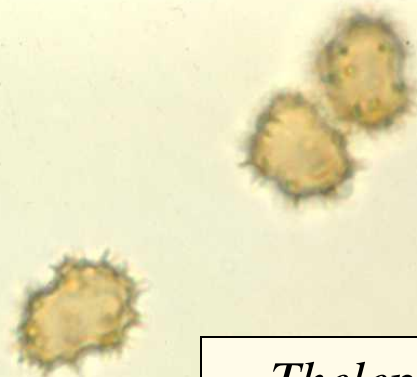
Stropharia



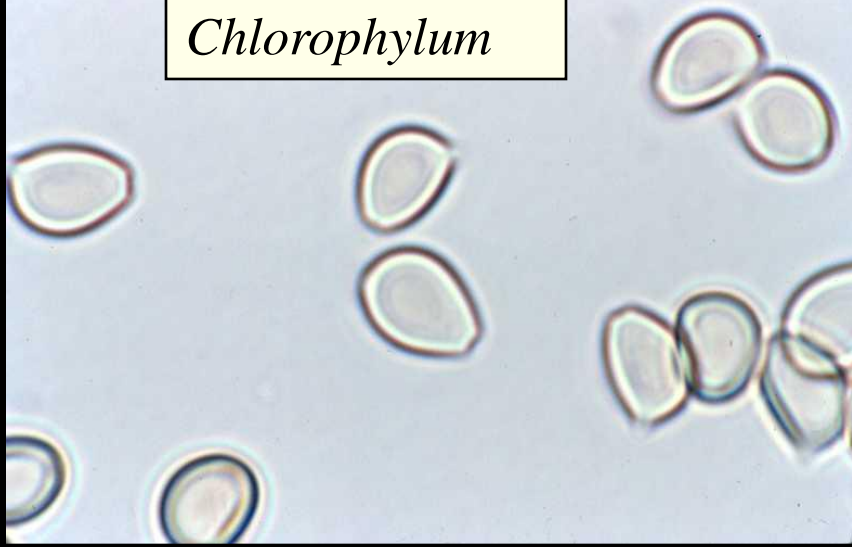
Boletus



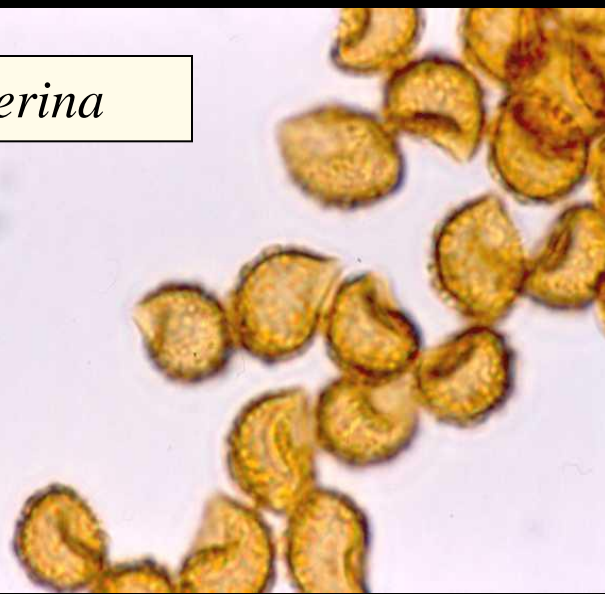
Thelephora

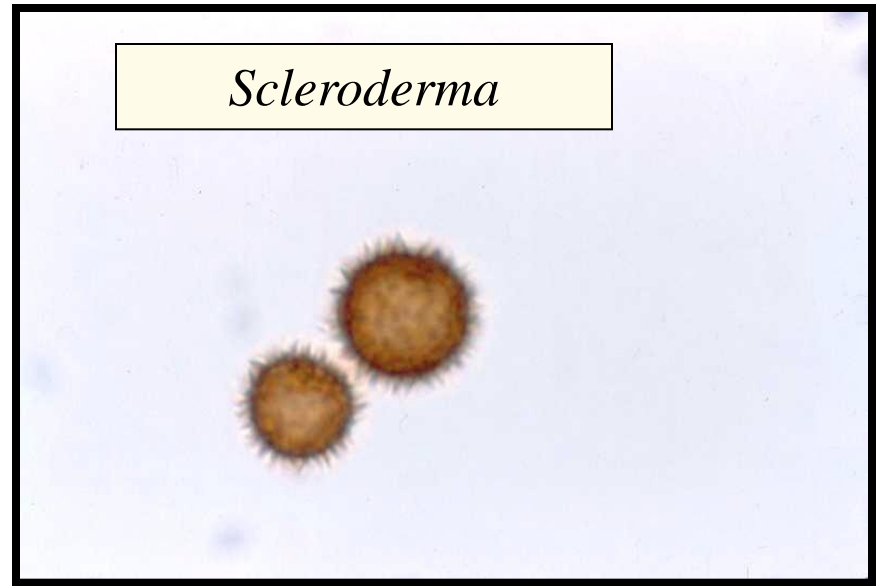
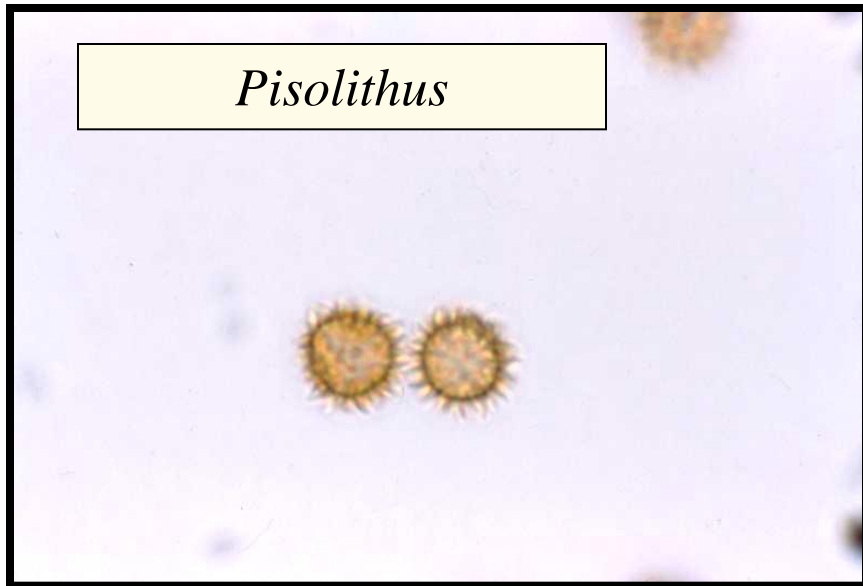
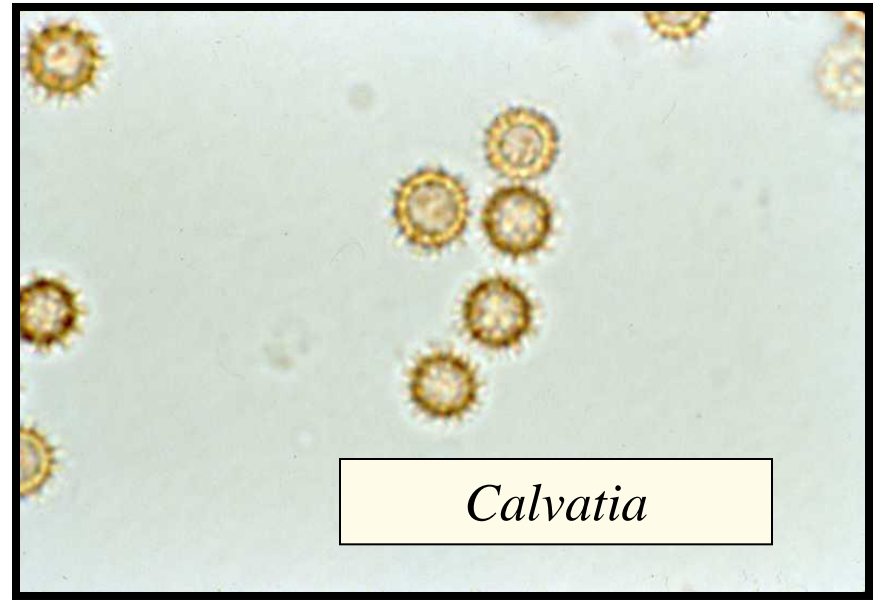
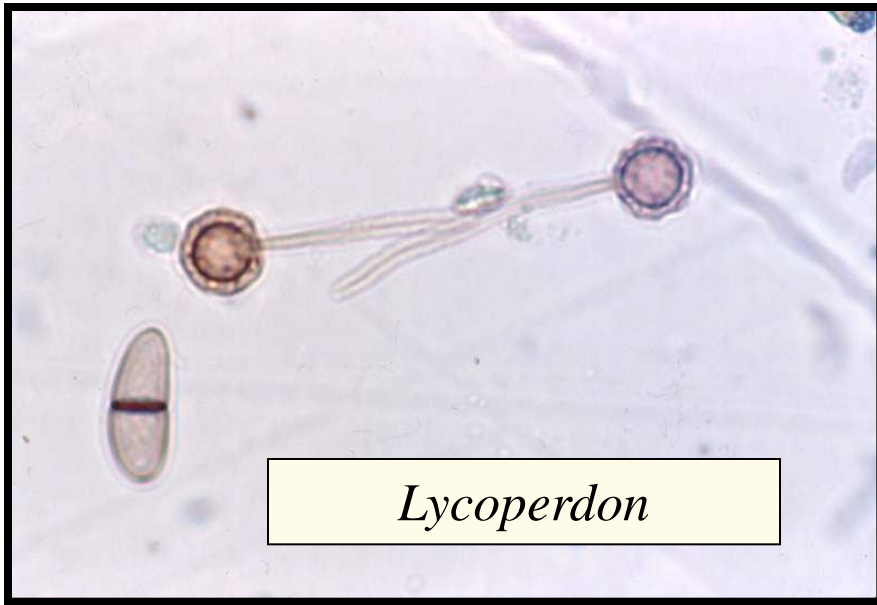


Chlorophyllum



Galerina





Mixed Basidiospores



Rust spores: *Puccinia*

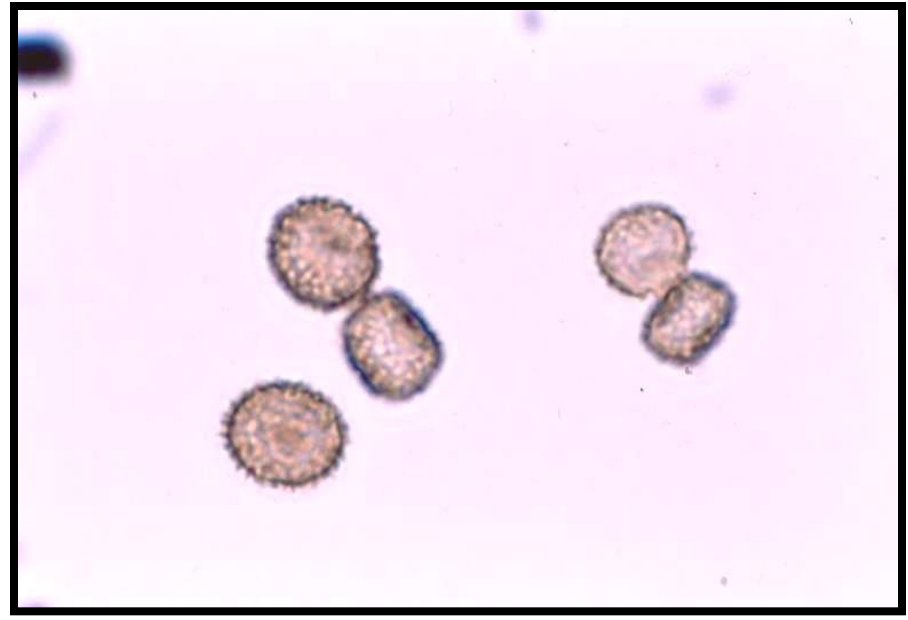


Puccinia uredospores



Puccinia teliospores

Smut Spores





Smut Spores



Myxomycete (slime mold) spores



Other slime mold spores

