

Session 1202: Basic Aeroallergen Course

Fungal Spore Morphology

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Disclosure

- No conflicts to disclose

Fungal Spore Characteristics

Characteristics

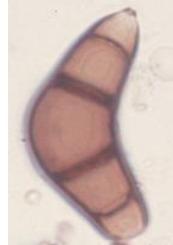
- Spore size
- Spore shape
- Number of cells
- Attachment Scars
- Wall characteristics
- Spore color

Spore Size, Shape, and Septation

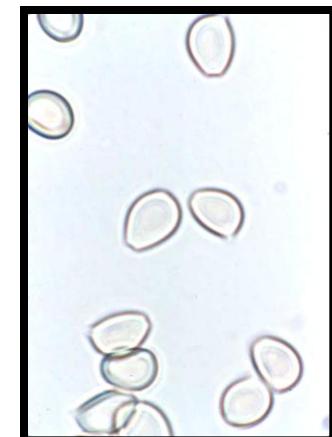
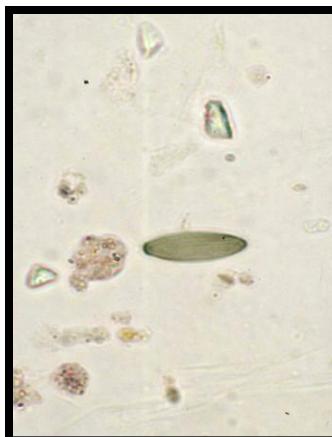
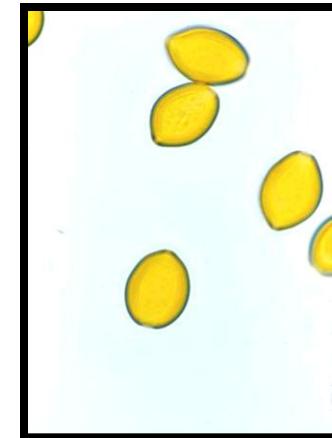
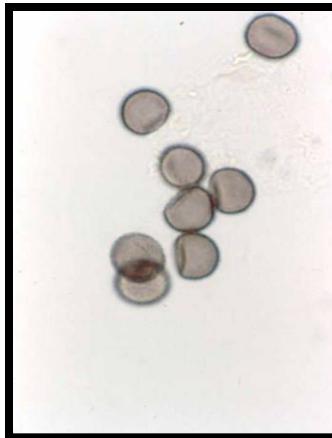
- **SIZE:** 2 μ m to 100 mm
- **SHAPE:** Globose, elliptical, fusiform, asymmetric, lemon-shaped, barrel-shaped, curved
- **SEPTATION:** Non-septate (one cell), single septum, transverse septa, transverse and longitudinal septa, random septa, pseudoseptate

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



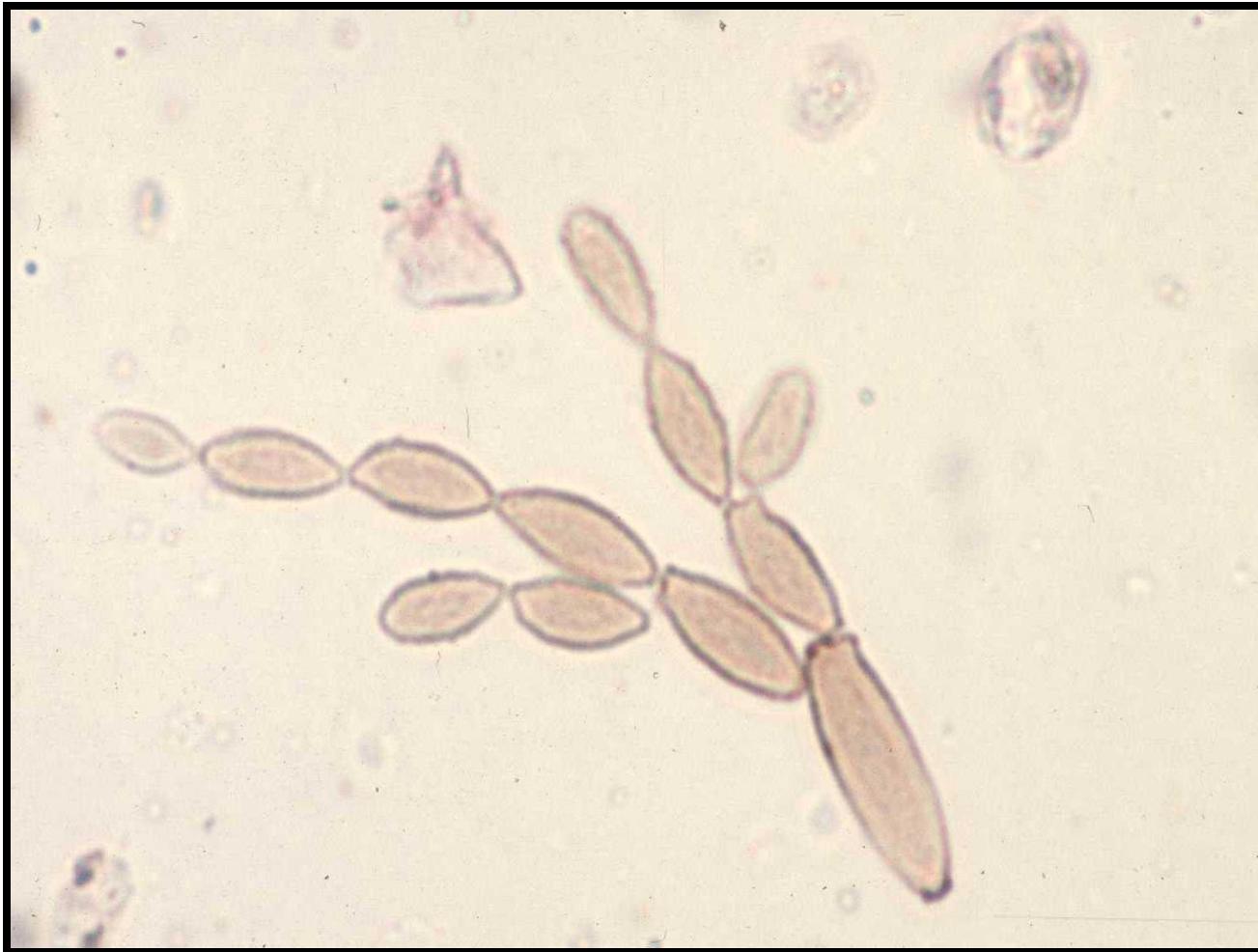
Asexual Spores

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



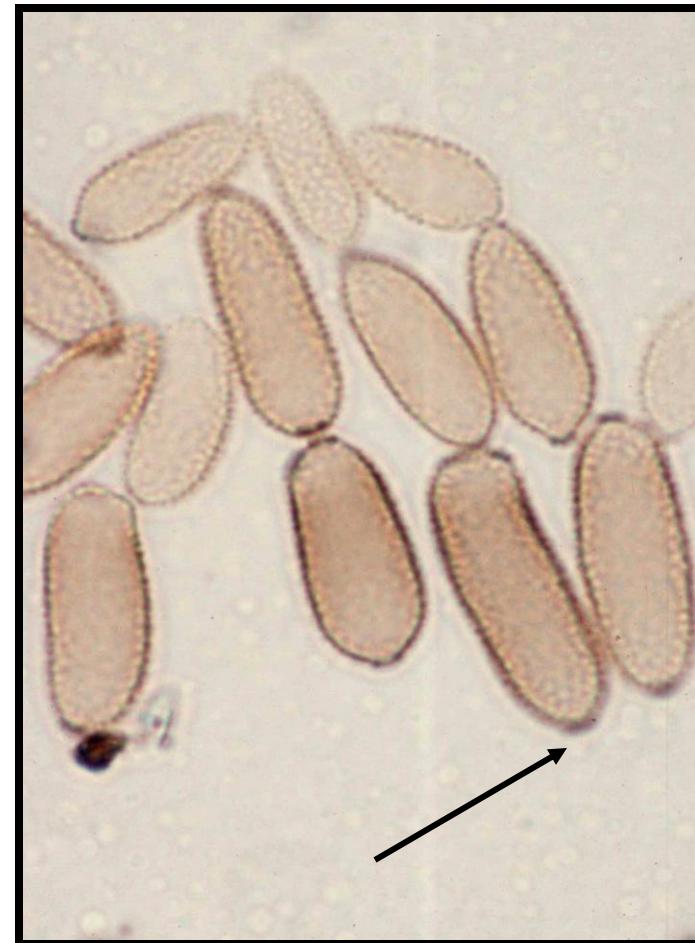
Cladosporium

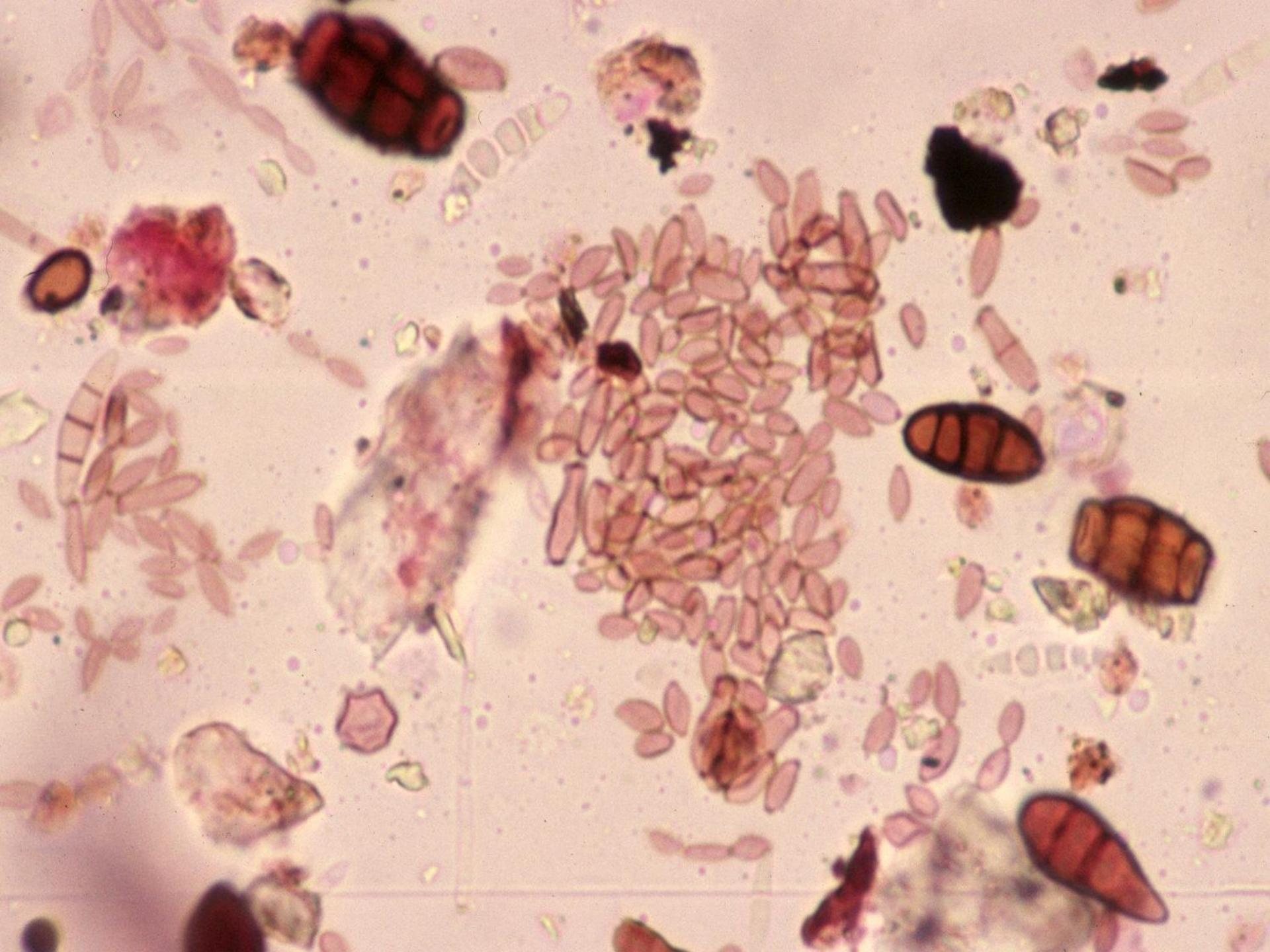


Several species of *Cladosporium*
are common in the atmosphere



Note the prominent attachment scars on *Cladosporium* conidia



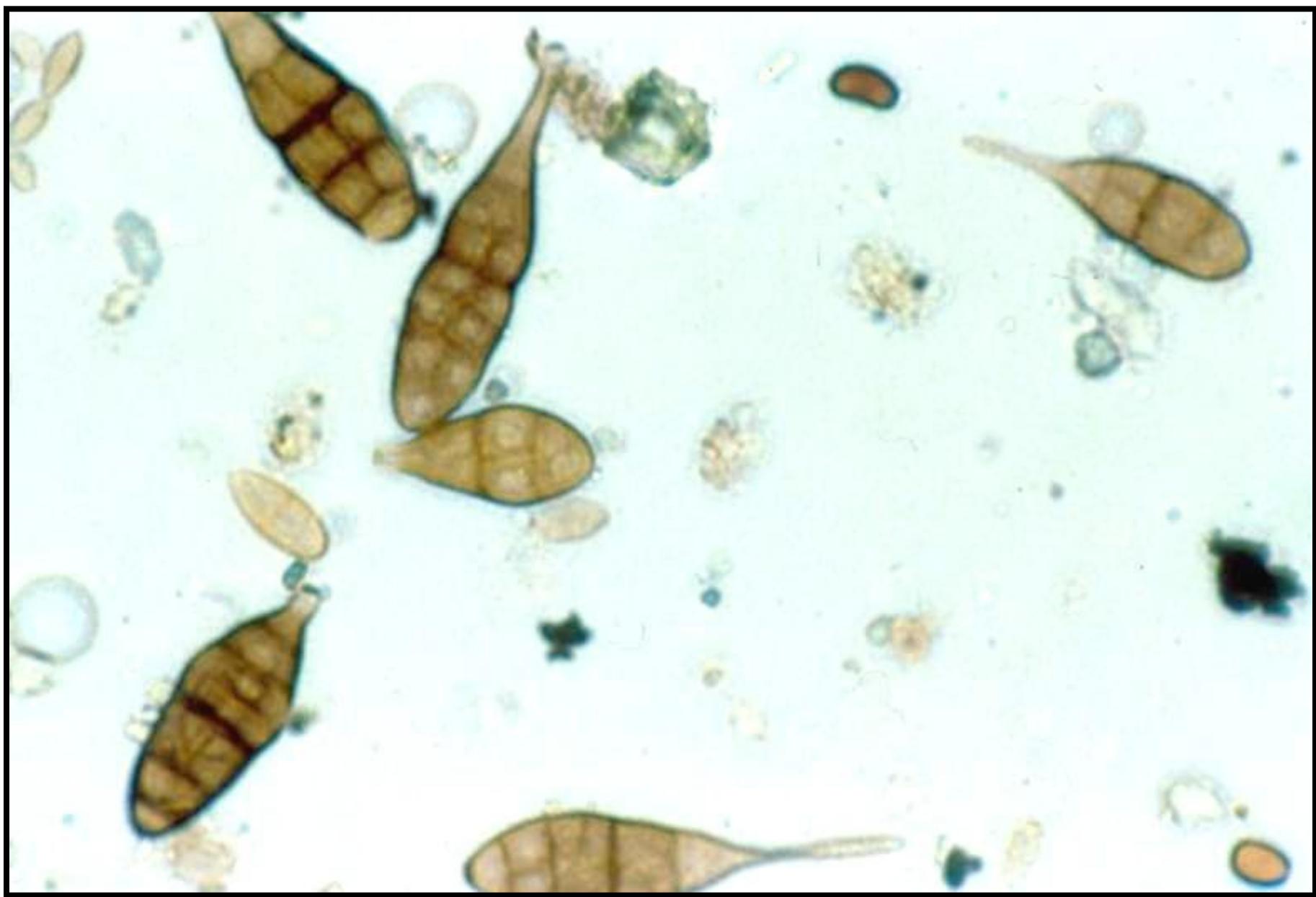


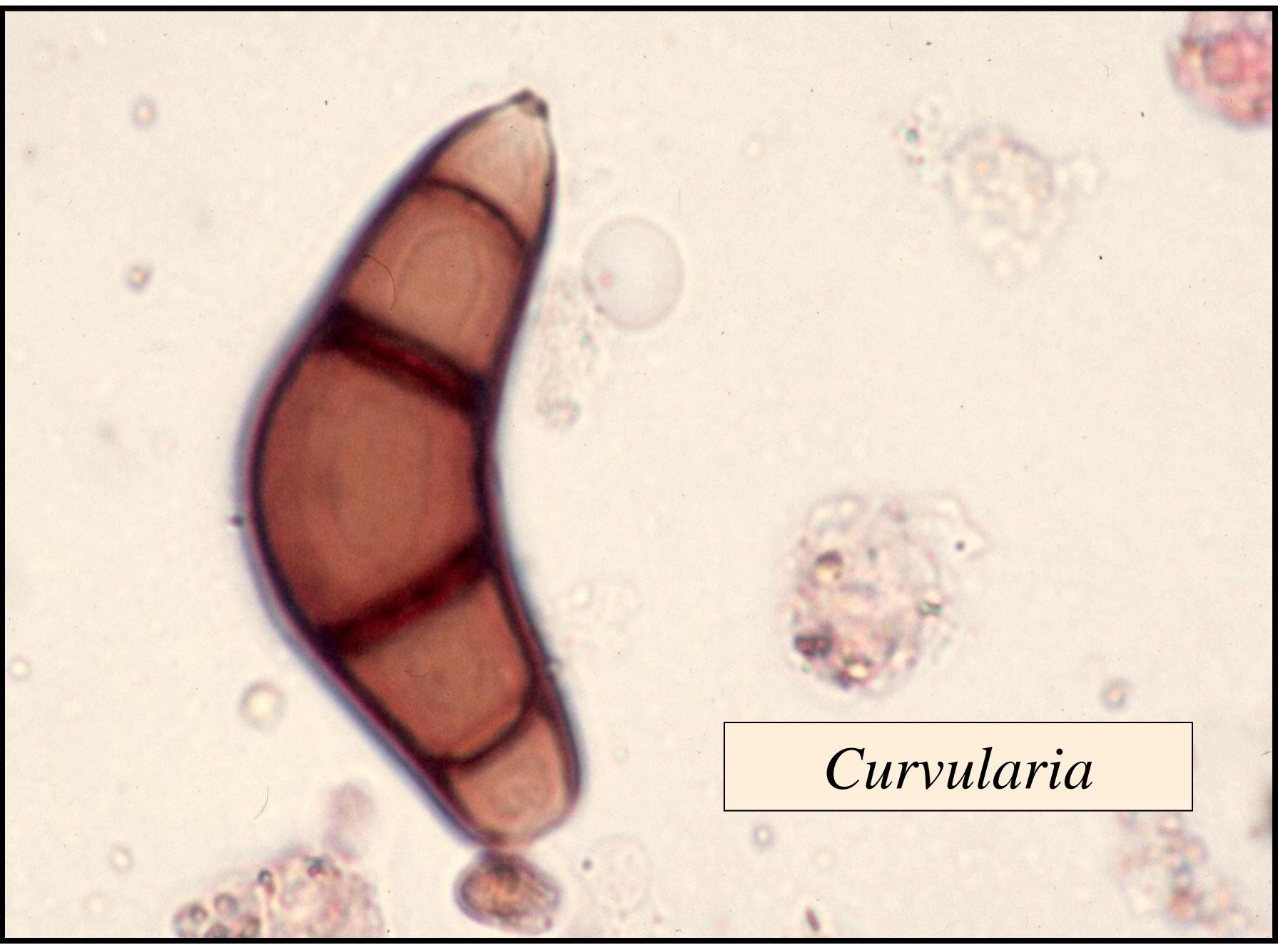
Alternaria



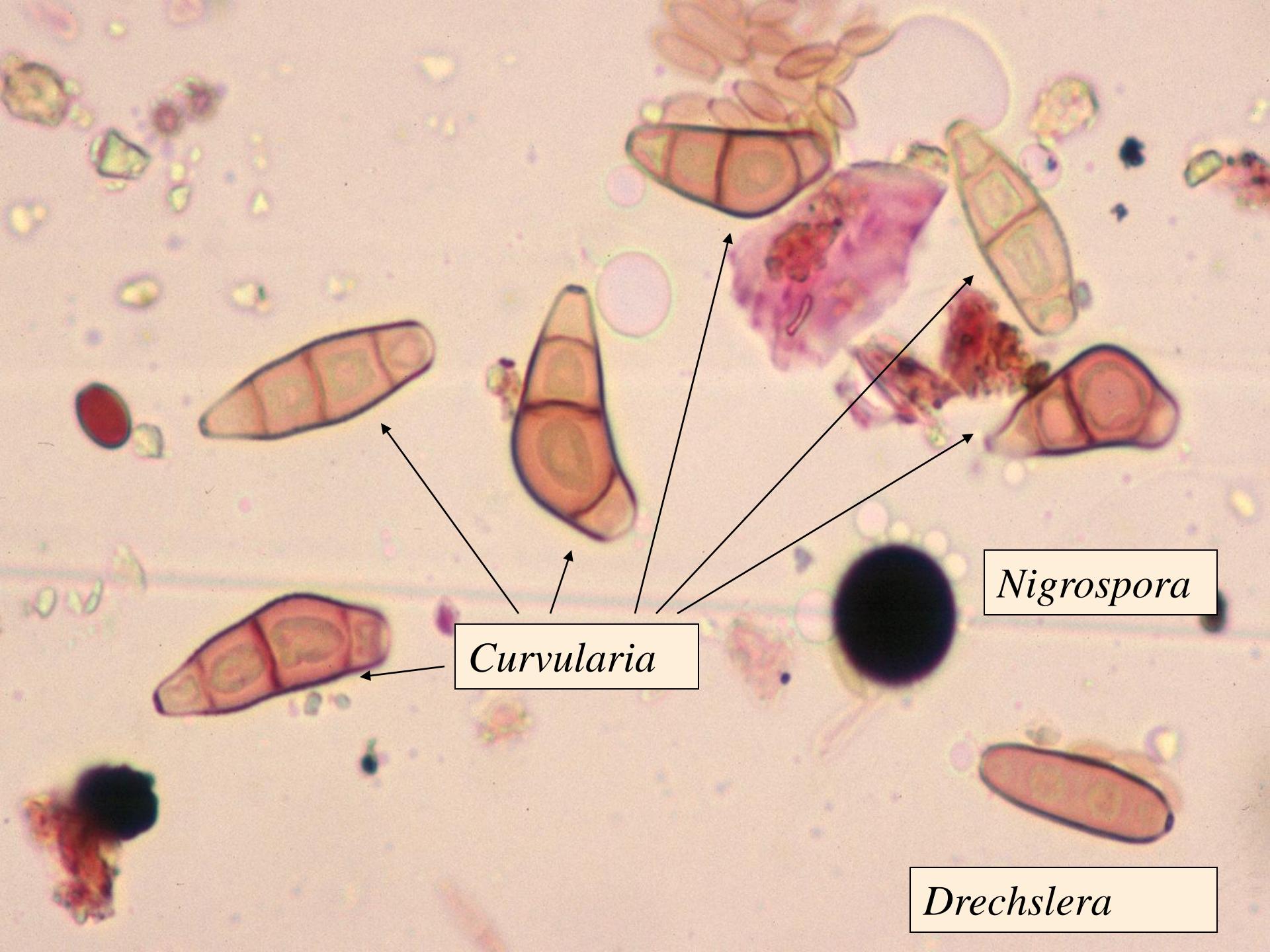
Alternaria





A microscopic image showing several large, dark brown, elongated spores of the genus Curvularia. One prominent spore is in the foreground, displaying a thick wall and a curved shape. In the background, there are numerous smaller, more rounded and granular structures, likely conidia or other fungal elements.

Curvularia



Drechslera-type spores

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



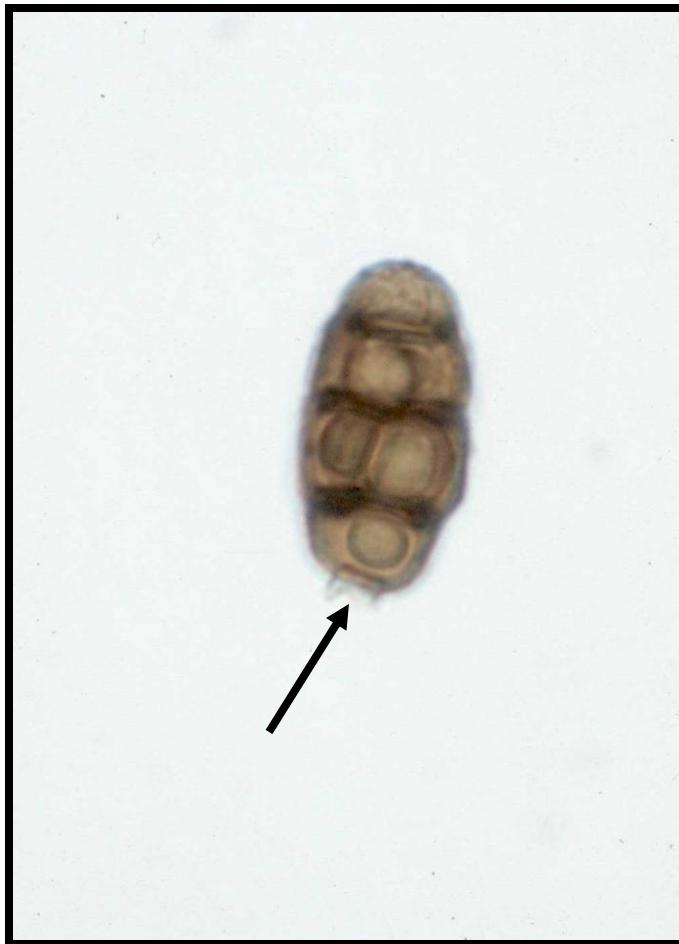
Drechslera-type spores



Pithomyces



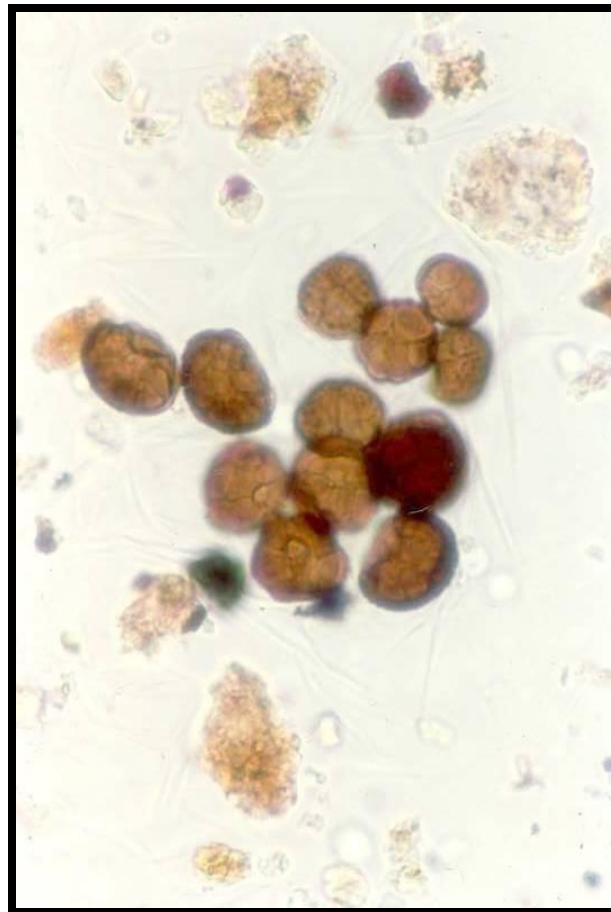
Note the colorless attachment at
the base of *Pithomyces* spores



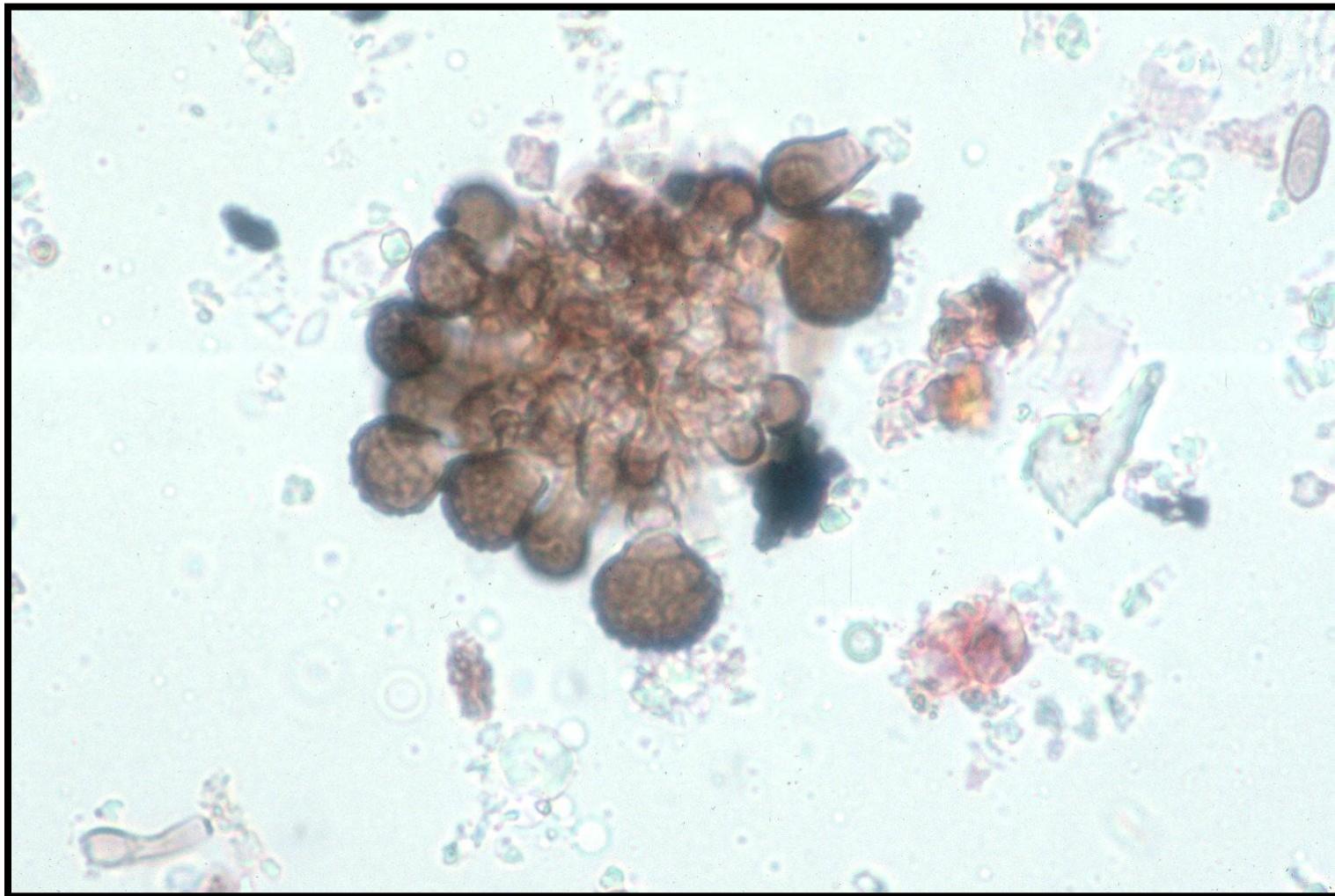
Pithomyces in culture



Epicoccum



Epicoccum spore cluster (sporodochium)

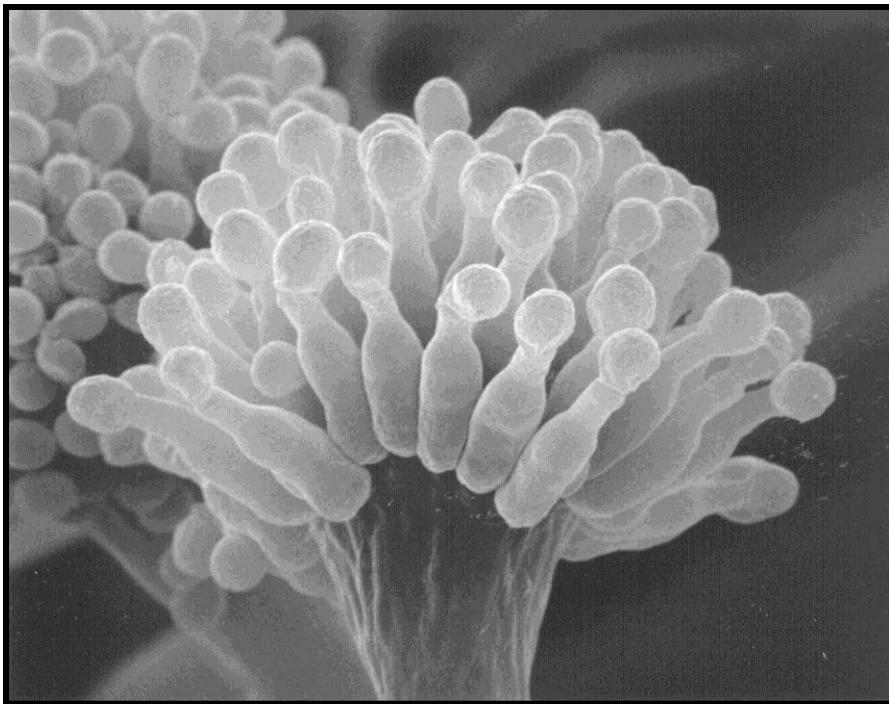


Penicillium species

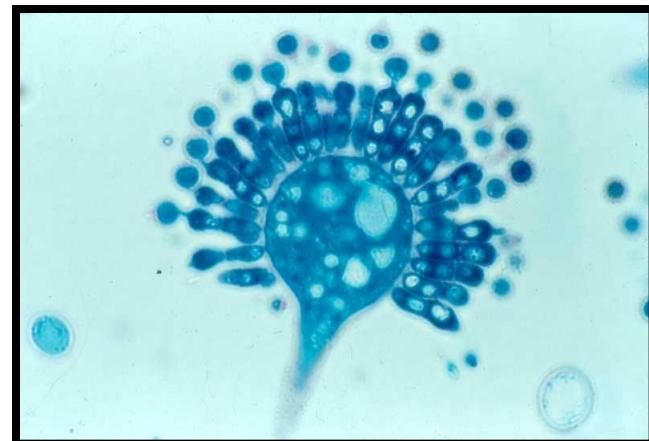
- Produce distinctive conidiophores (spore bearing structures)
- Spores are usually spherical to oval and form in chains



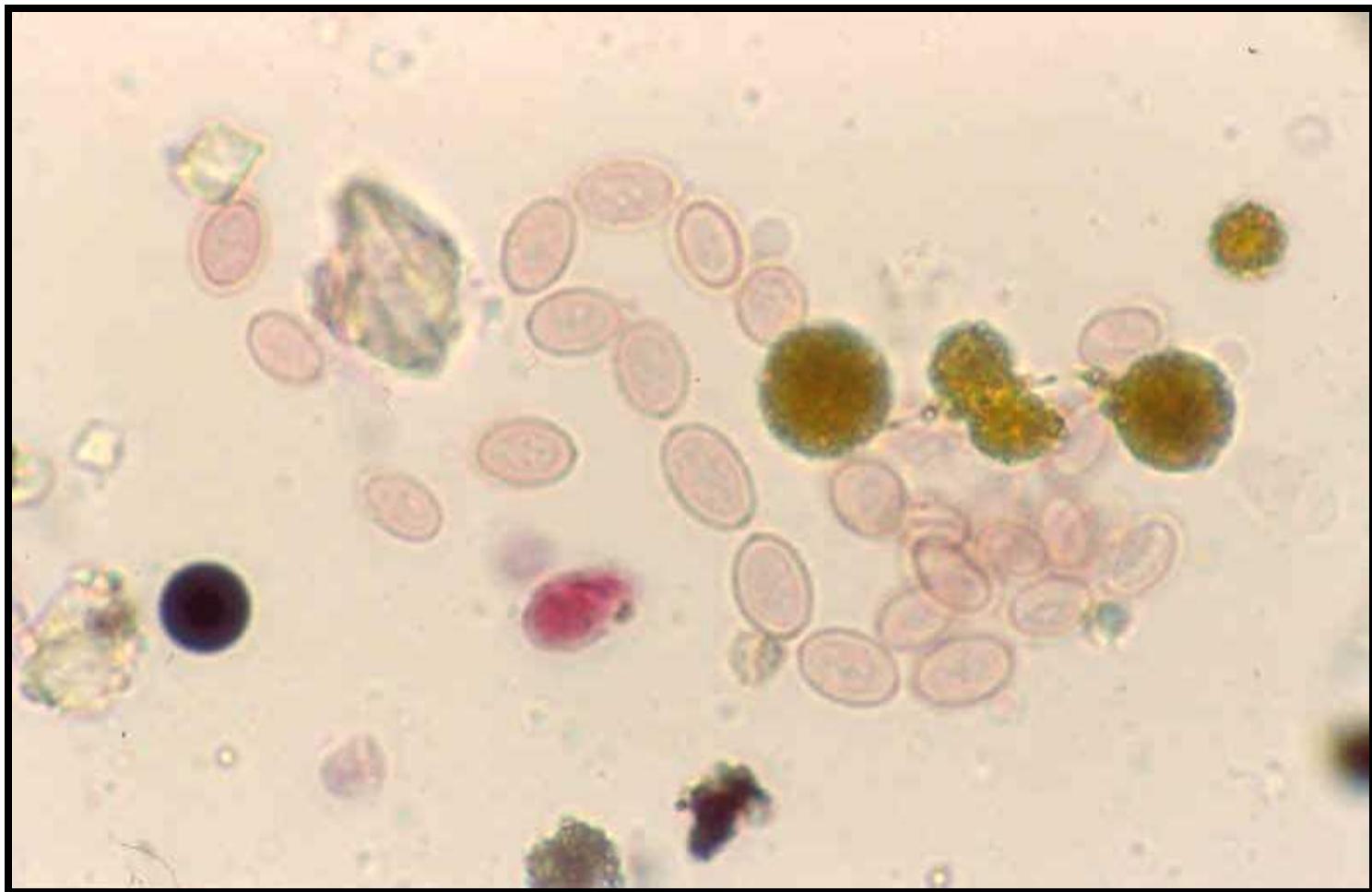
Aspergillus species



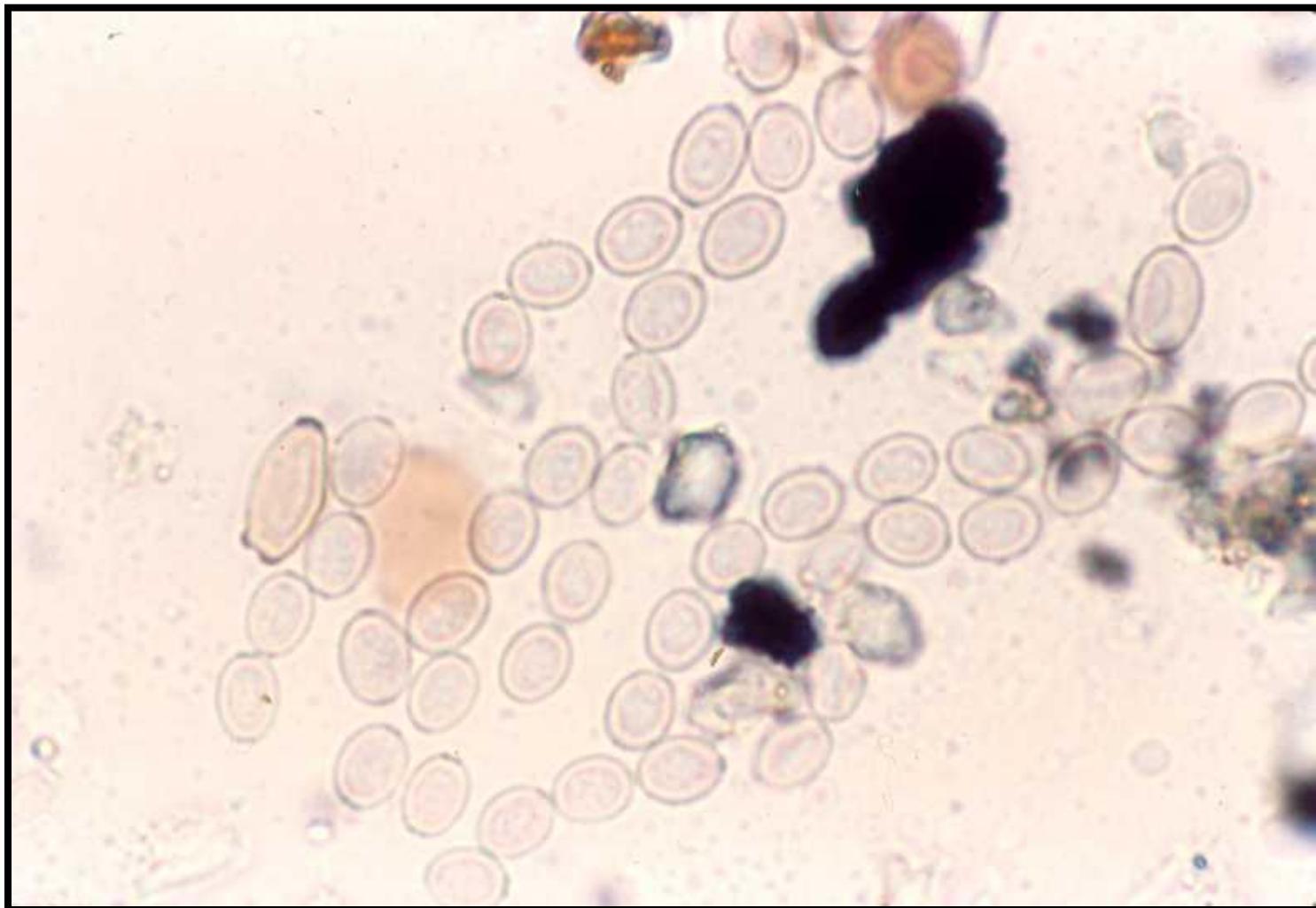
- Produce distinctive conidiophores (spore bearing structures)
- Spores are usually spherical to oval and form in chains



Penicillium-Aspergillus type spores



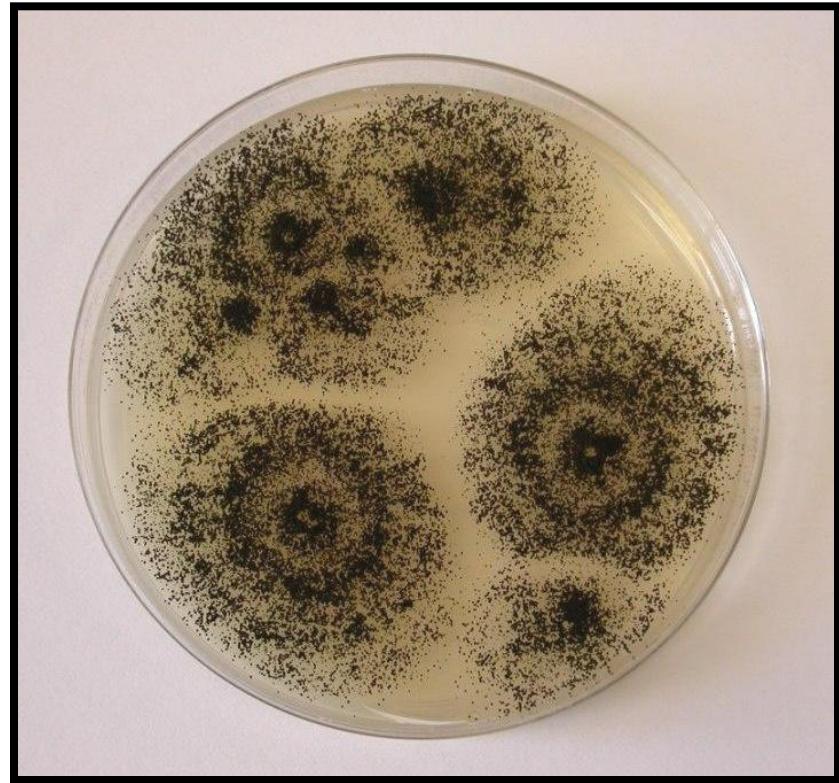
Penicillium-Aspergillus type spores



Aspergillus niger spores



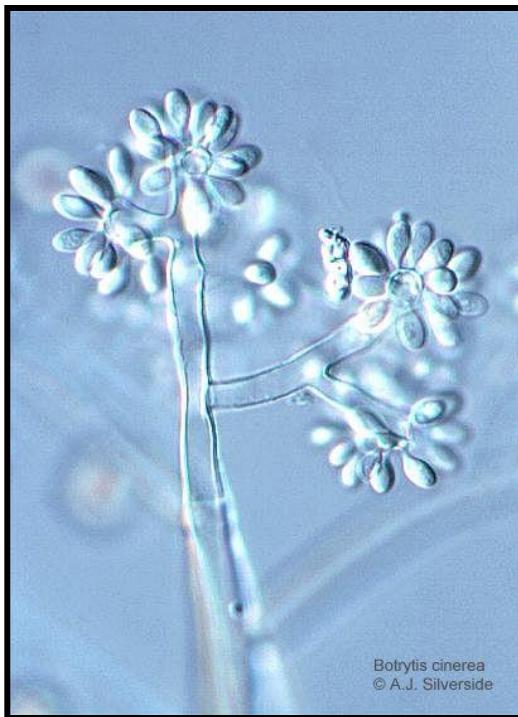
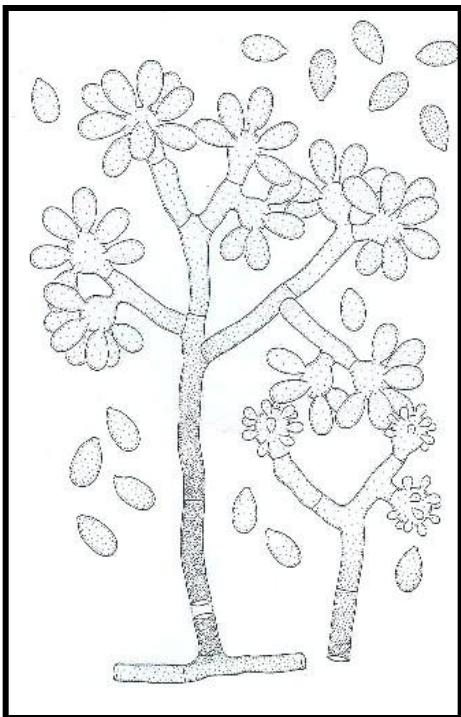
Aspergillus niger in culture



A microscopic image showing numerous elongated, curved spores of the genus Fusarium. These spores are characterized by a thick, dark, wavy or undulating pattern along their length. They are scattered across a light-colored, slightly textured background, which appears to be a thin film or a layer of material. Some spores are more prominent than others, appearing larger and more clearly defined.

Fusarium

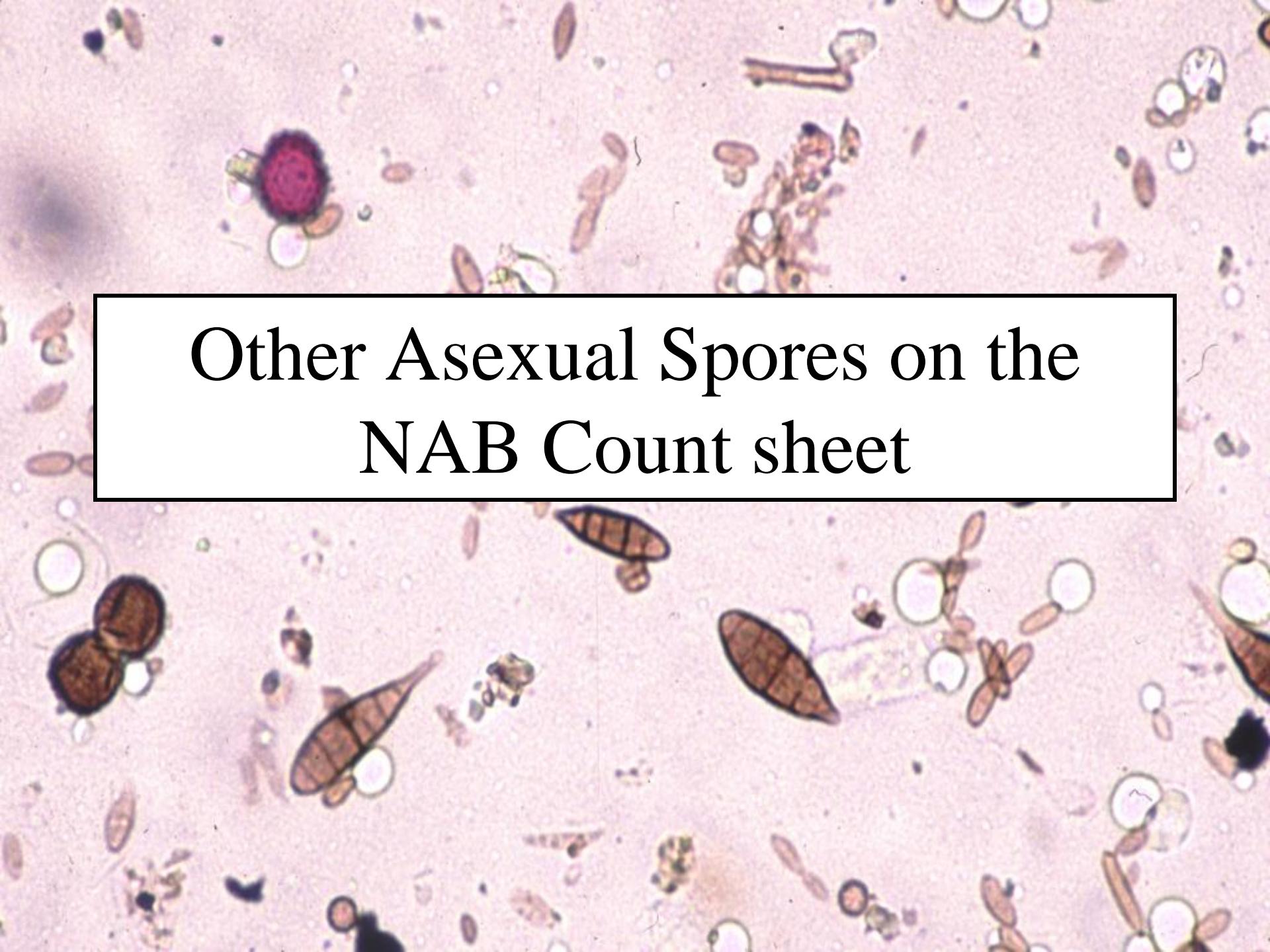
Botrytis



Botryotinia allii
© A.J. Silverside

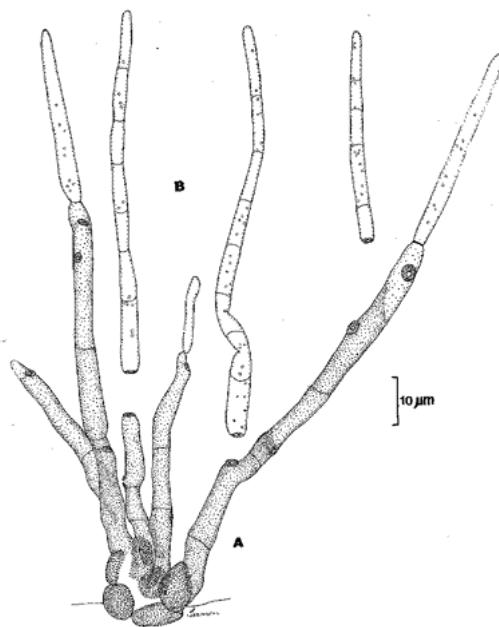
Oidium



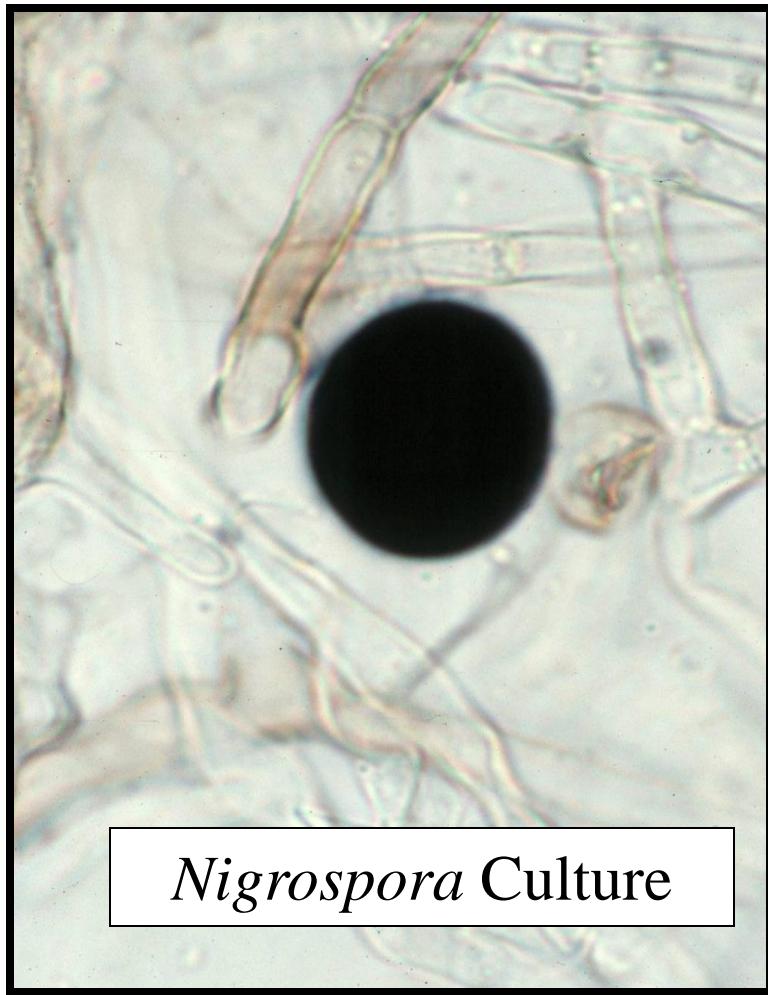
A microscopic image showing a variety of asexual spores on a light-colored background. The spores are stained in shades of brown, tan, and purple. Some are single, some are in pairs or small groups, and others are part of larger clusters. A prominent cluster of dark brown, oval-shaped spores is visible in the lower-left quadrant.

Other Asexual Spores on the NAB Count sheet

Cercospora



Nigrospora



Nigrospora Culture



Air Sample

Periconia

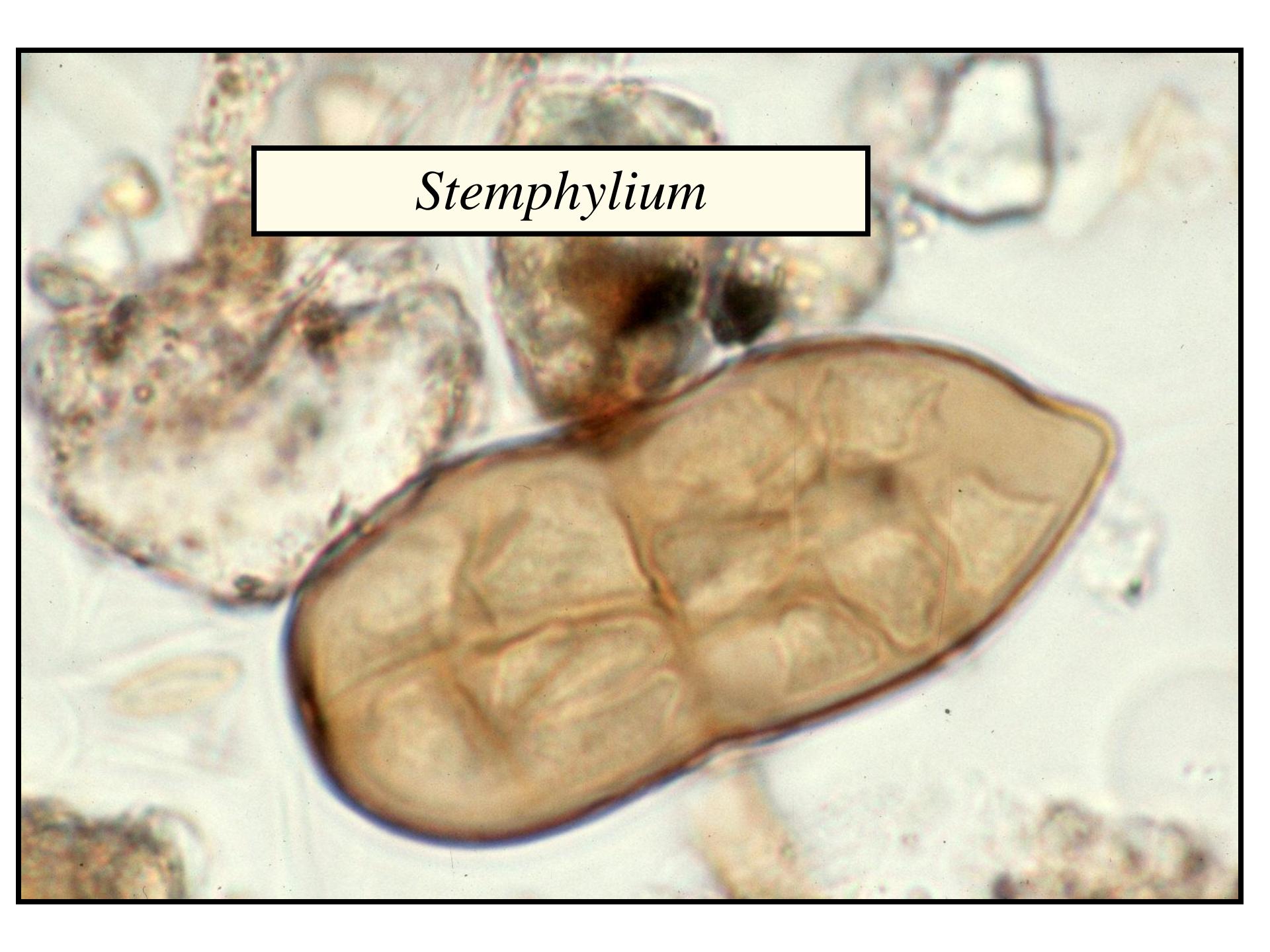


Polythrincium

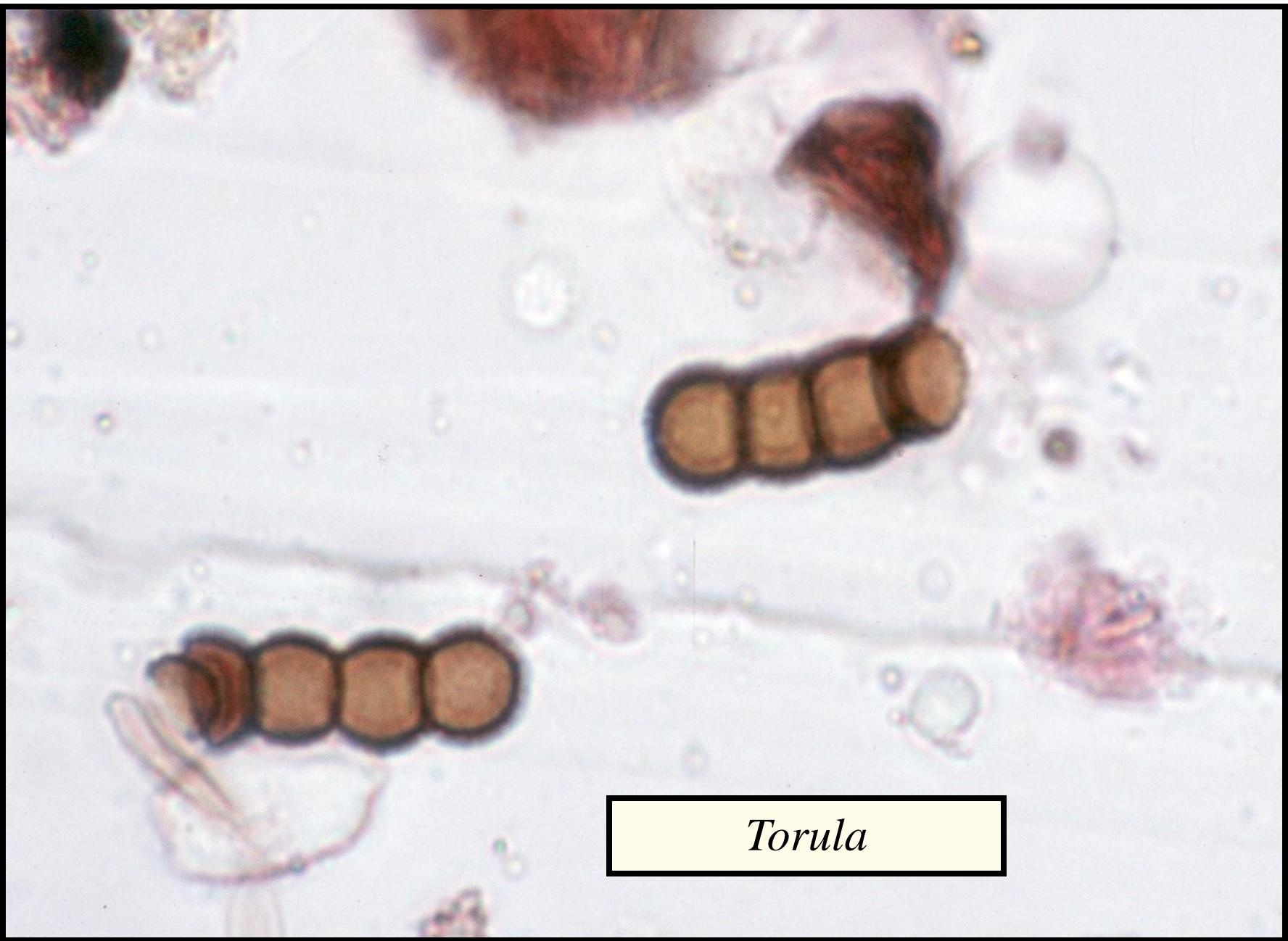


Peronospora

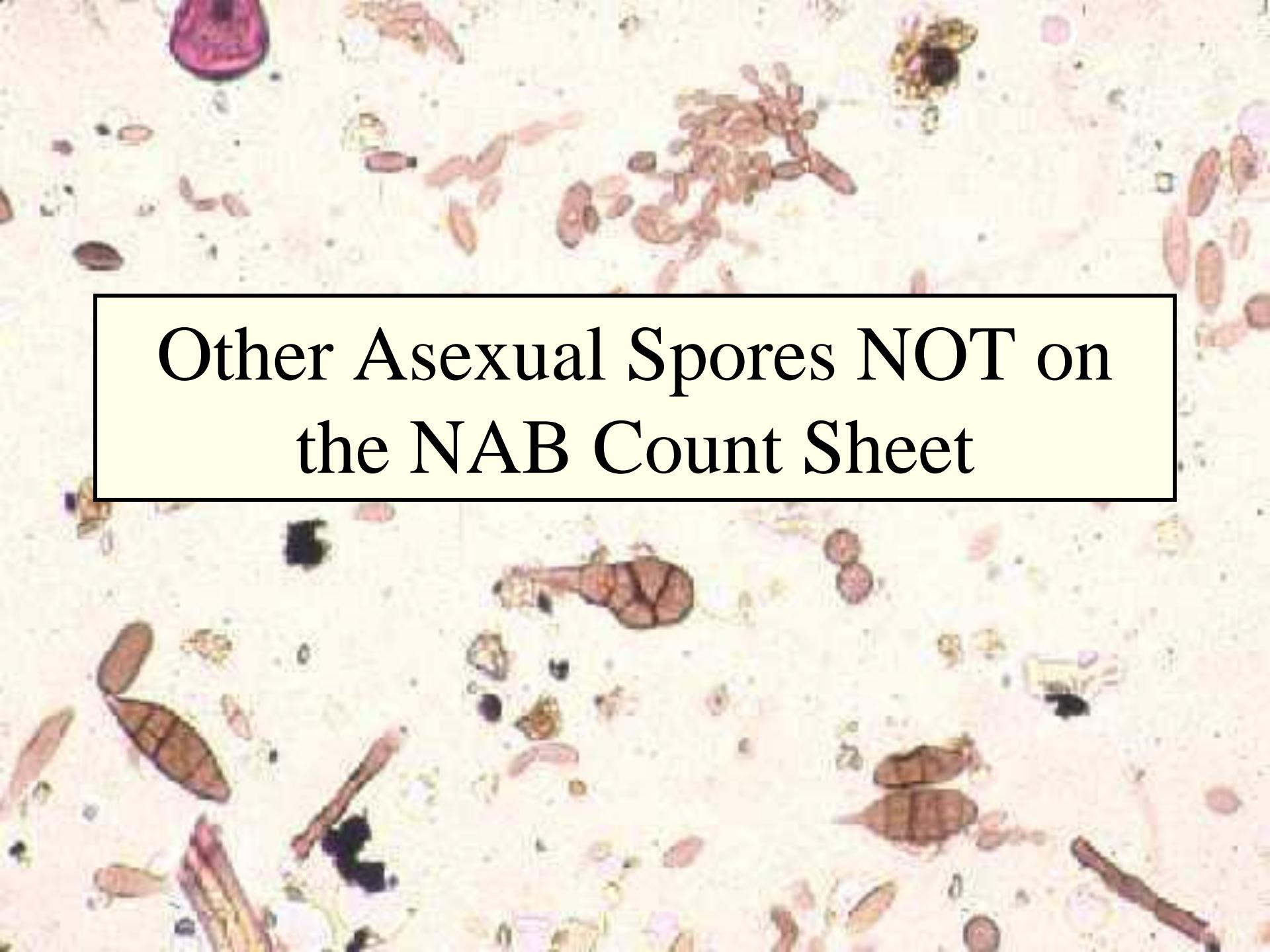


A microscopic image showing several oval-shaped spores of the genus Stemphylium. One prominent spore in the foreground is large and light brown, displaying a complex internal structure with darker, longitudinal stripes. Other smaller, more rounded spores are visible in the background.

Stemphylium



Torula

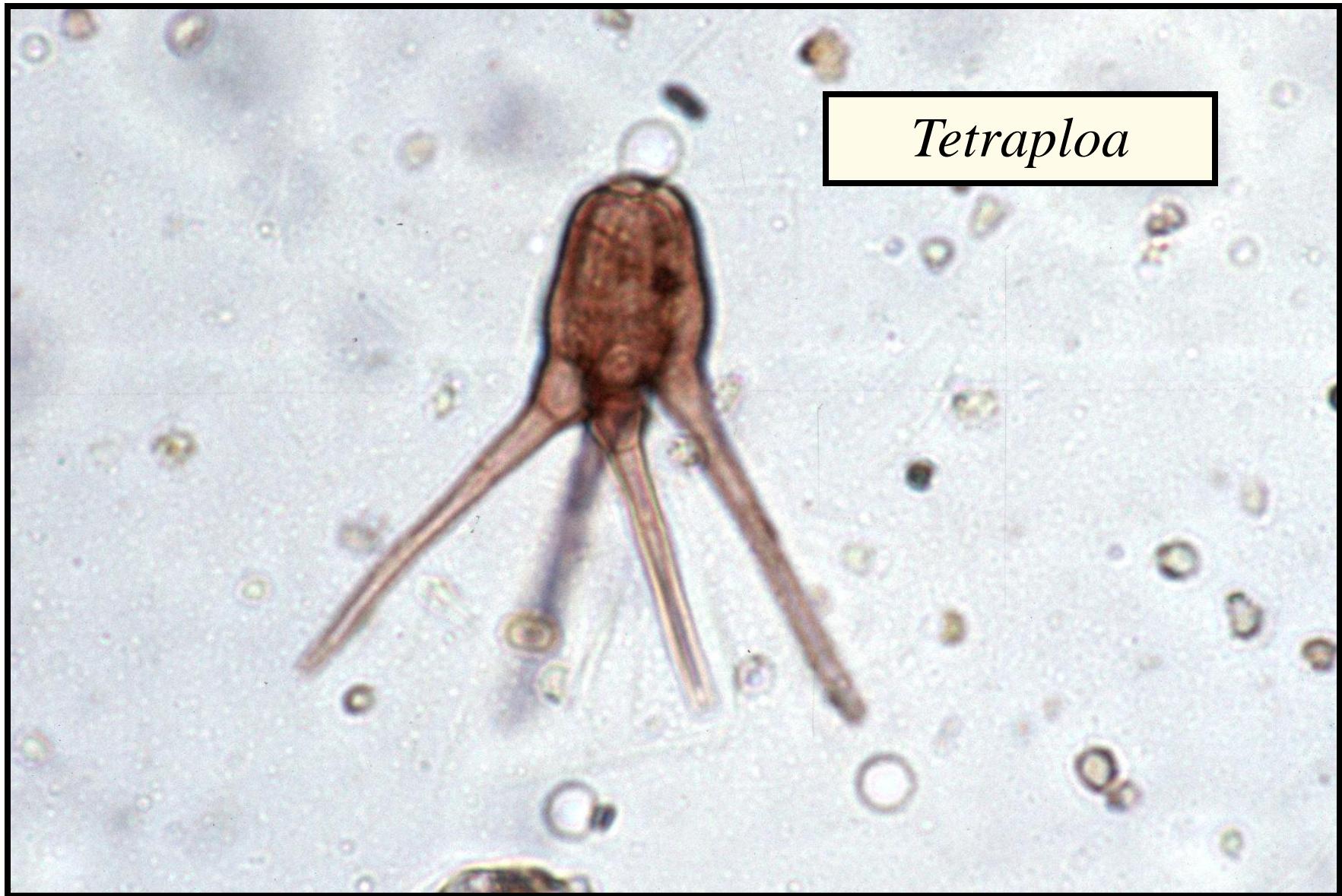
A microscopic image showing a variety of asexual spores on a light-colored background. The spores are of different sizes, shapes, and colors, including brown, black, and pinkish-purple. Some are individual cells, while others are in small groups or chains.

Other Asexual Spores NOT on
the NAB Count Sheet

Spegazzinia



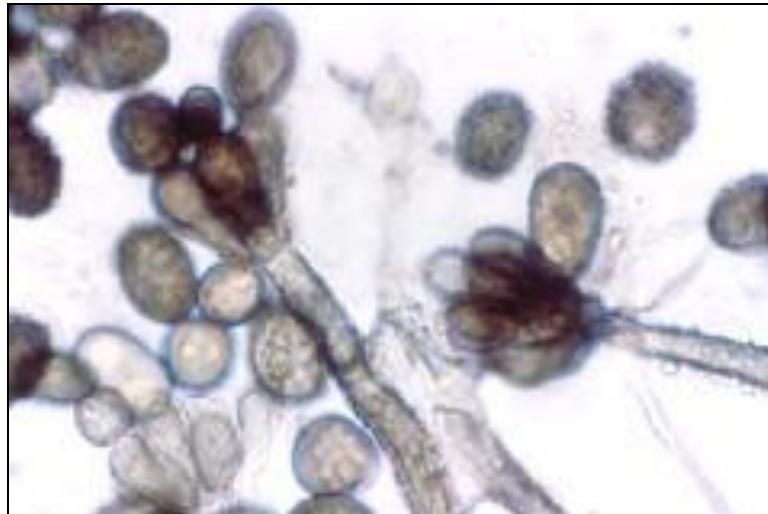
Tetraploa





Pestalotiopsis

Stachybotrys



Division Ascomycota



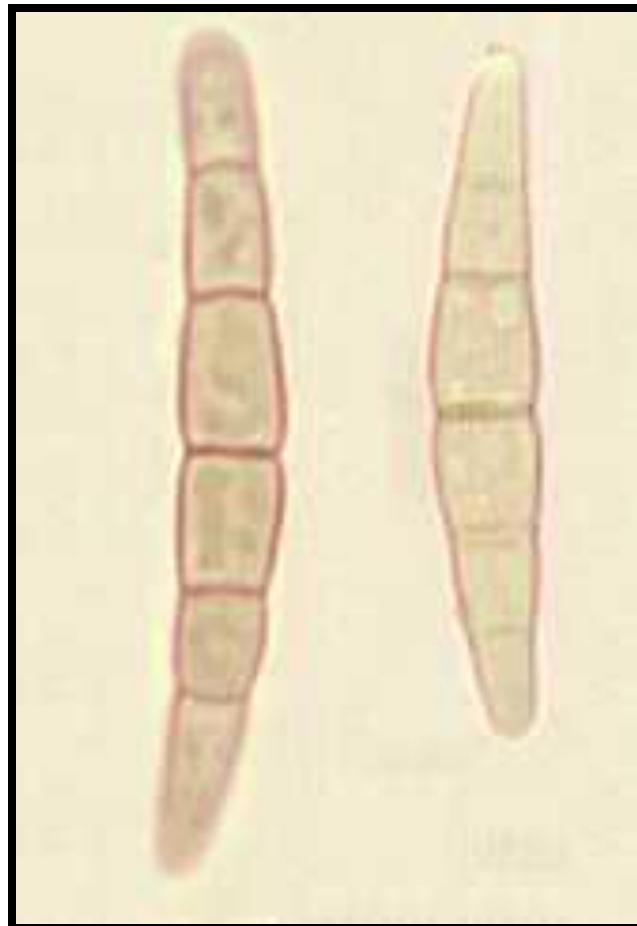
Eight ascospores are produced in each ascus
without any attachment scars

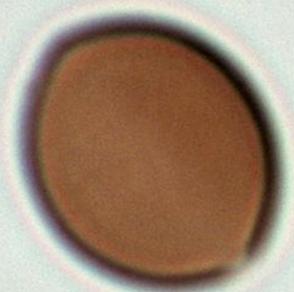


Ascospores are sometimes found in groups of eight in air samples



**Leptosphaeria* ascospores



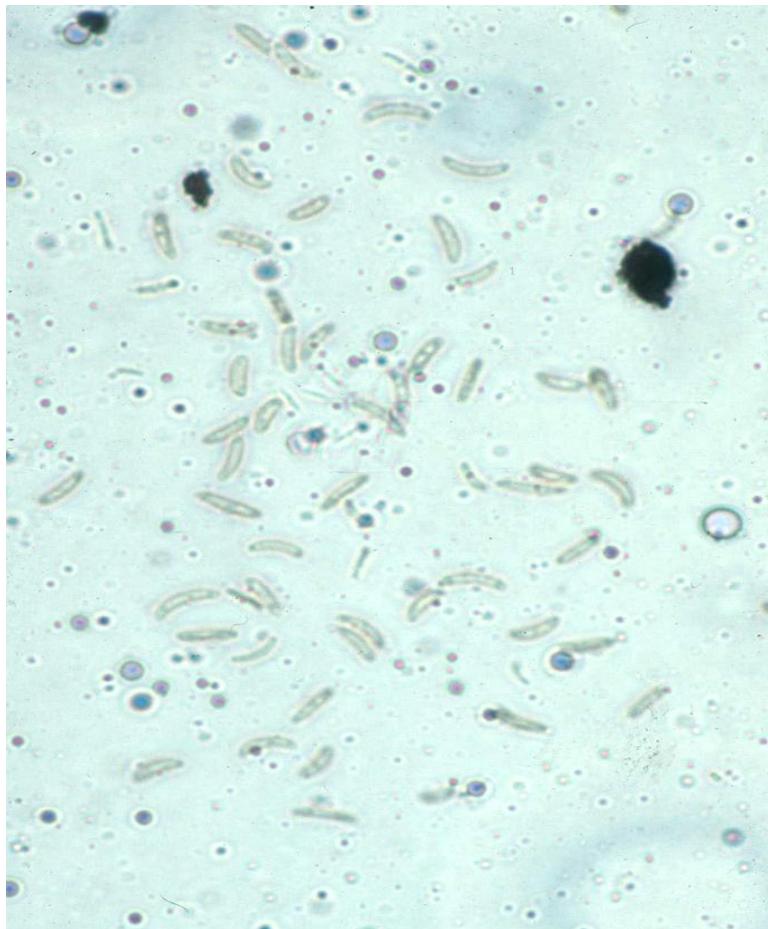


**Chaetomium ascospores*

**Pleospora*
ascospores



Diatrypella ascospores
(*Family Diatrypaceae)



Phaeosphaeria annulata



Bright field



Phase contrast

Sporomiella ascospores



Venturia ascospores



Paraphaeosphaeria ascospore



Leptosphaerulina ascospore



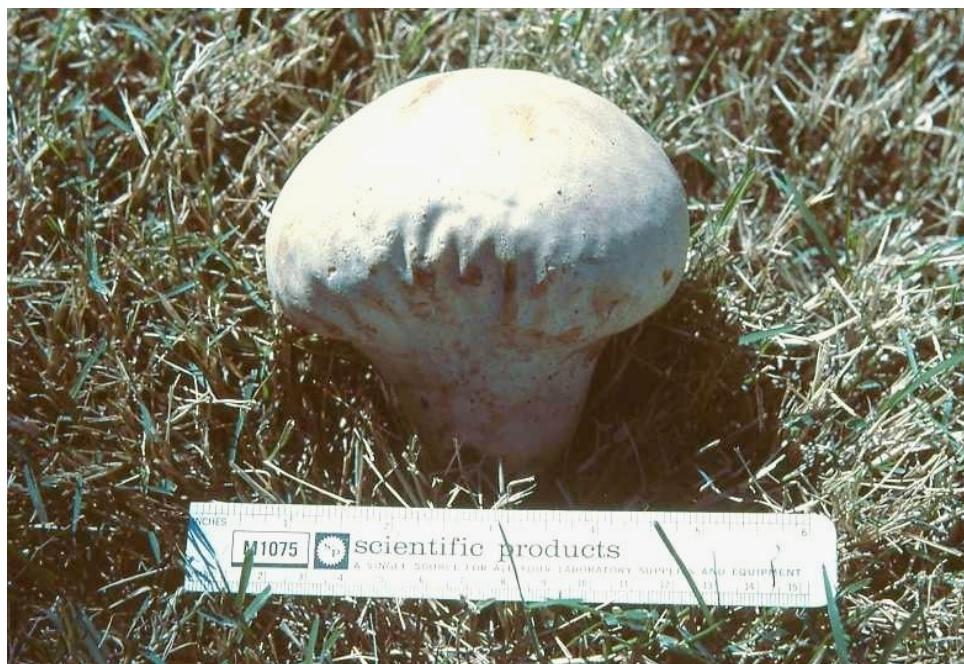
Various ascospores

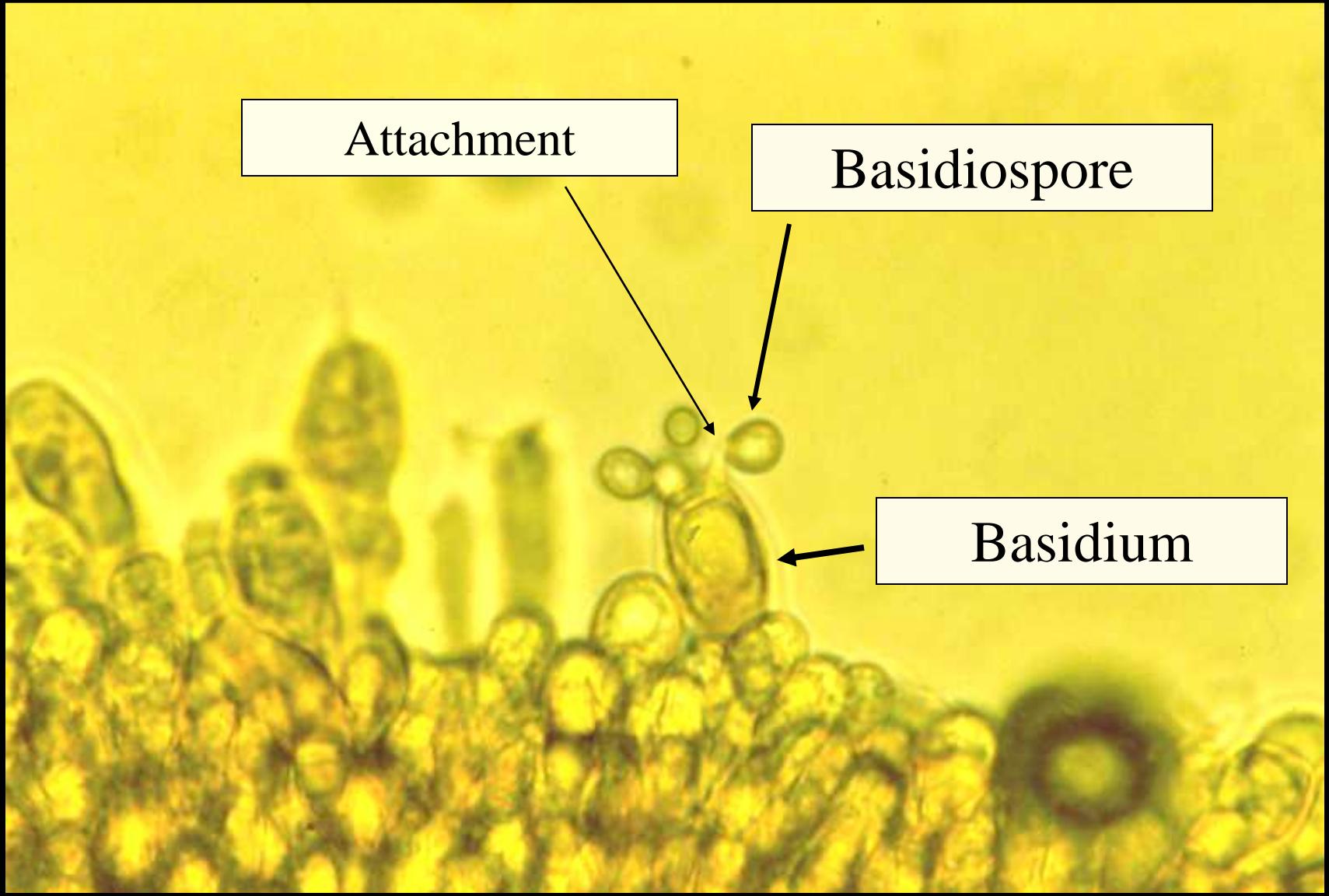


Many ascospores on a rainy day



Division Basidiomycota





Attachment

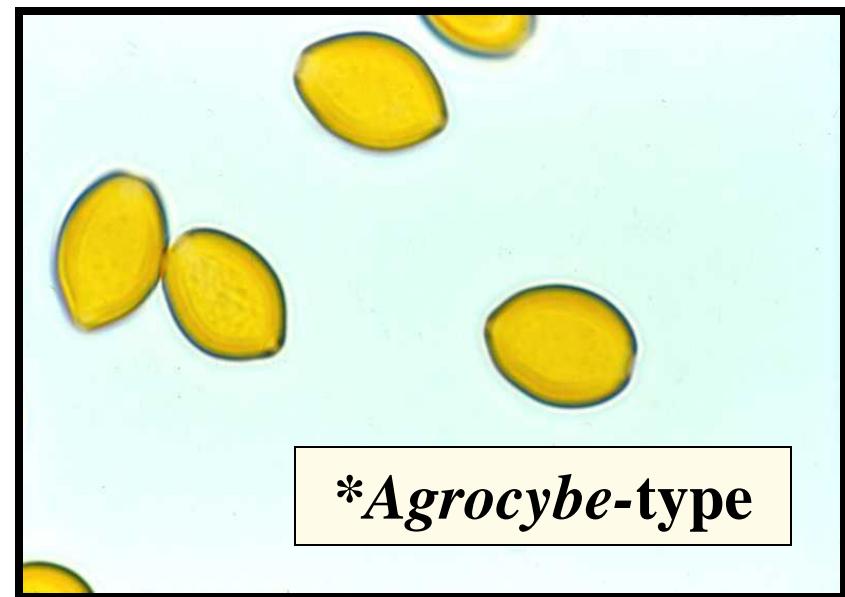
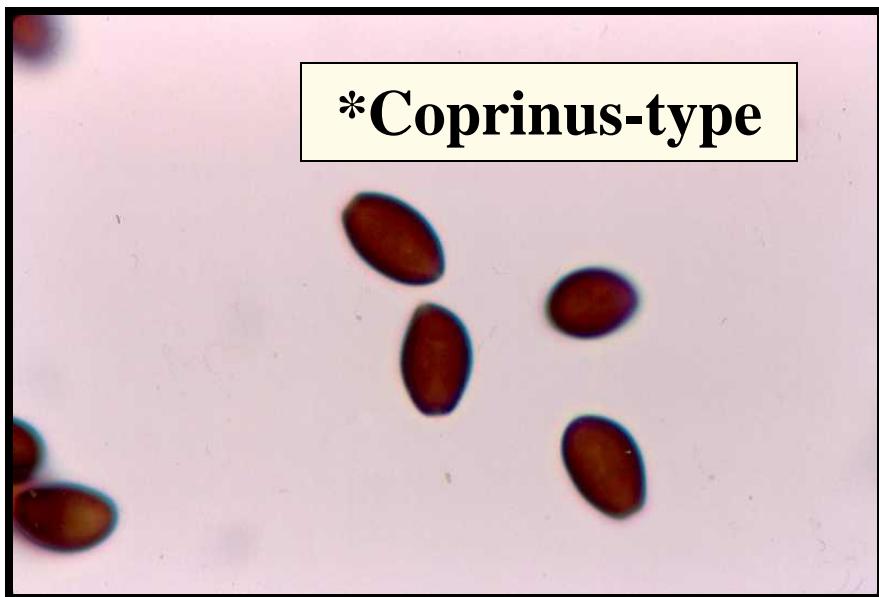
Basidiospore

Basidium

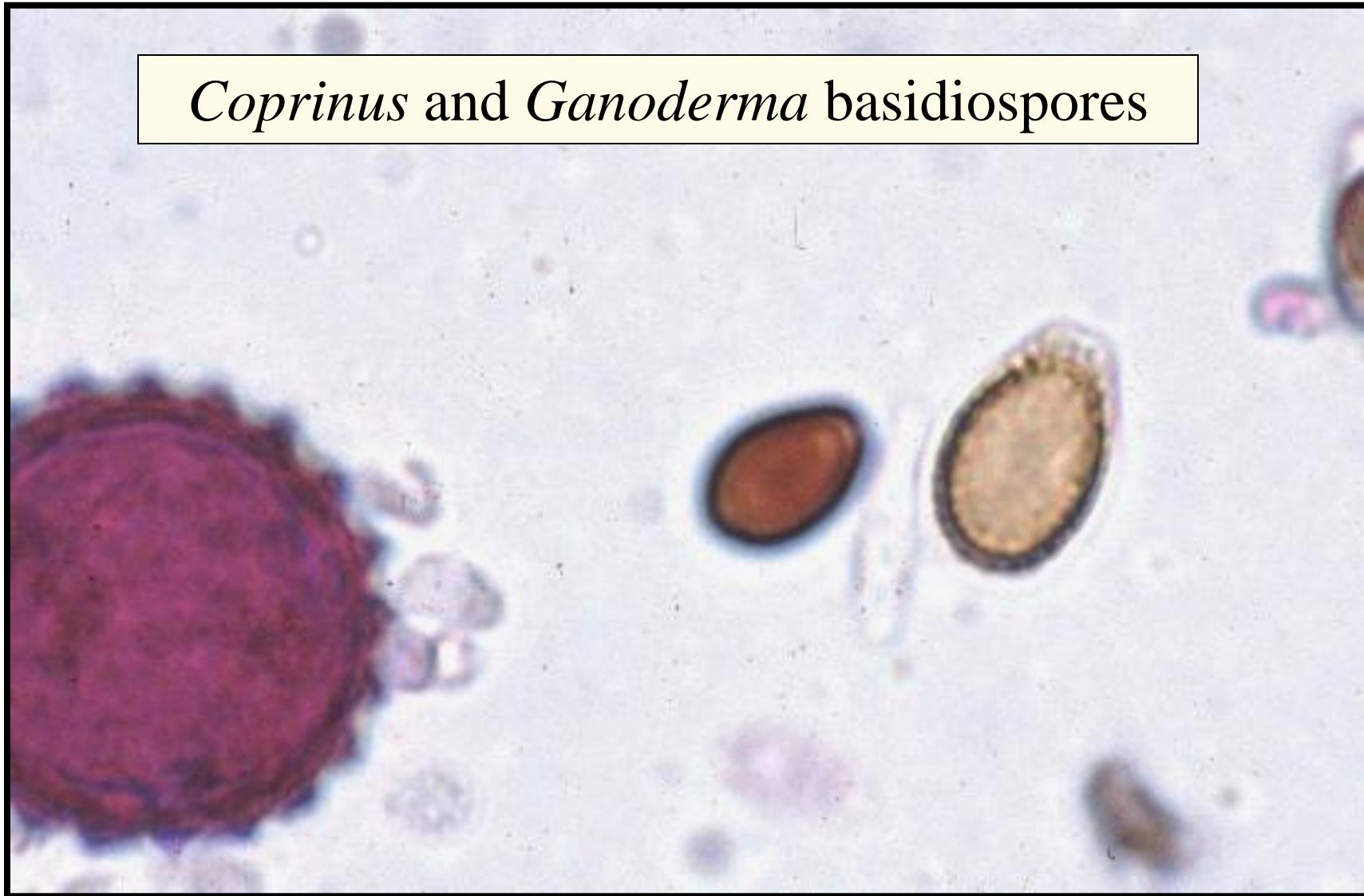
**Ganoderma* basidiospores



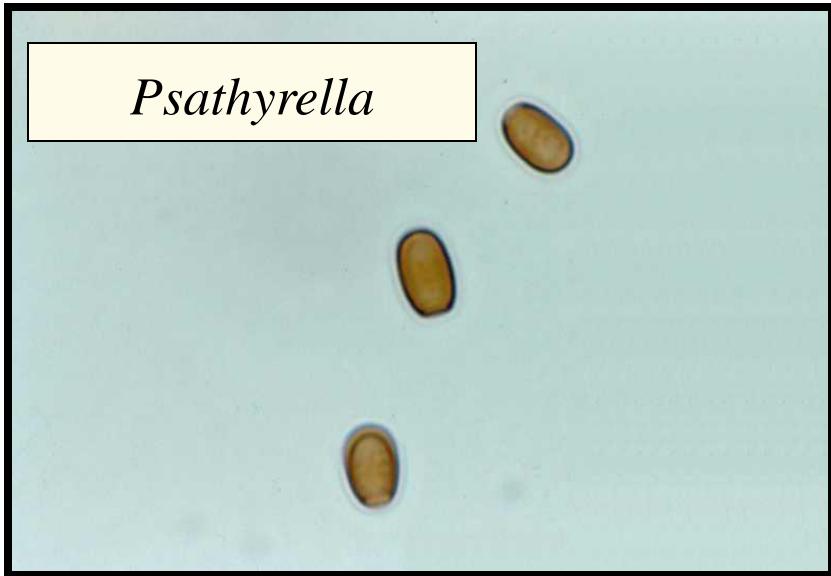
Other basidiospores that are easy to recognize



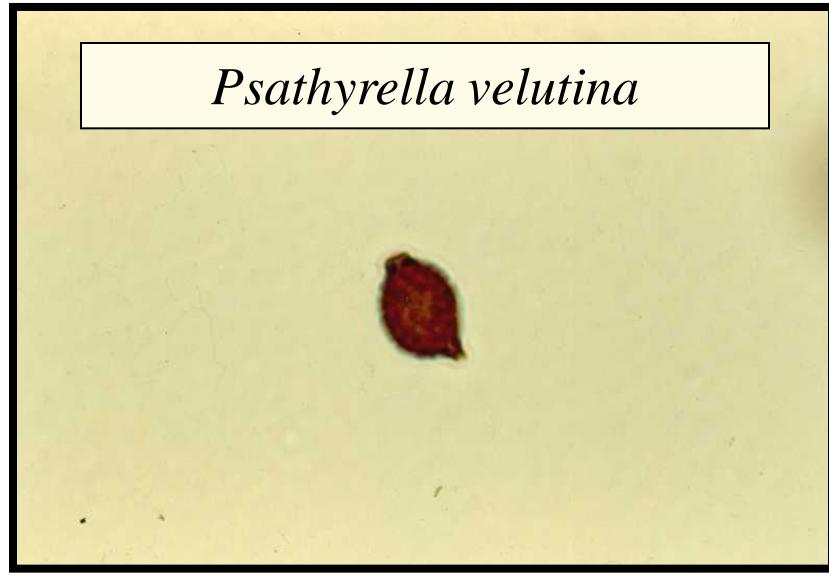
Coprinus and *Ganoderma* basidiospores



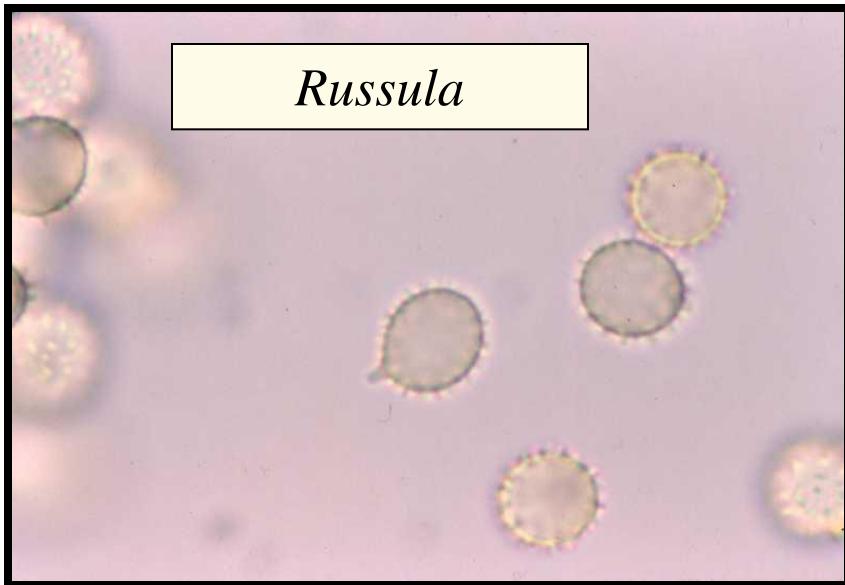
Psathyrella



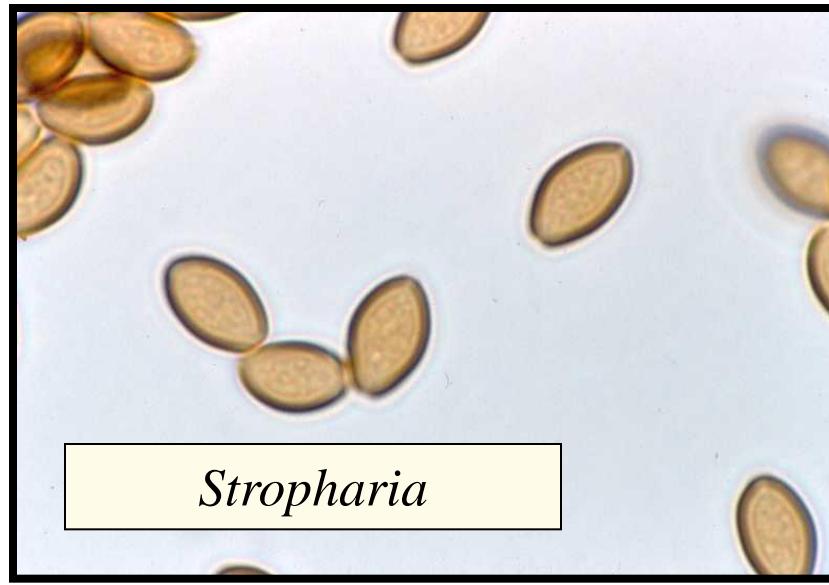
Psathyrella velutina



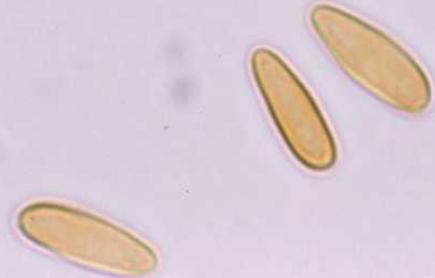
Russula



Stropharia



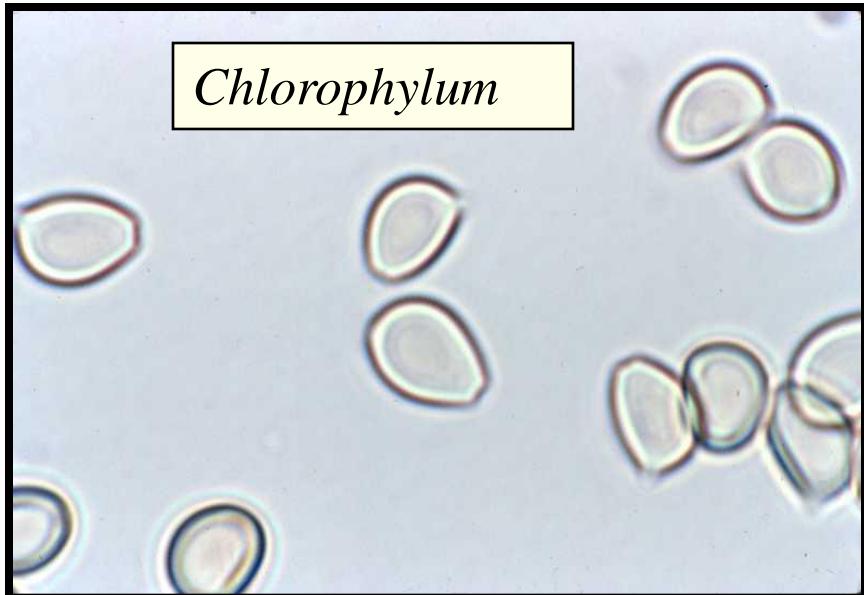
Boletus



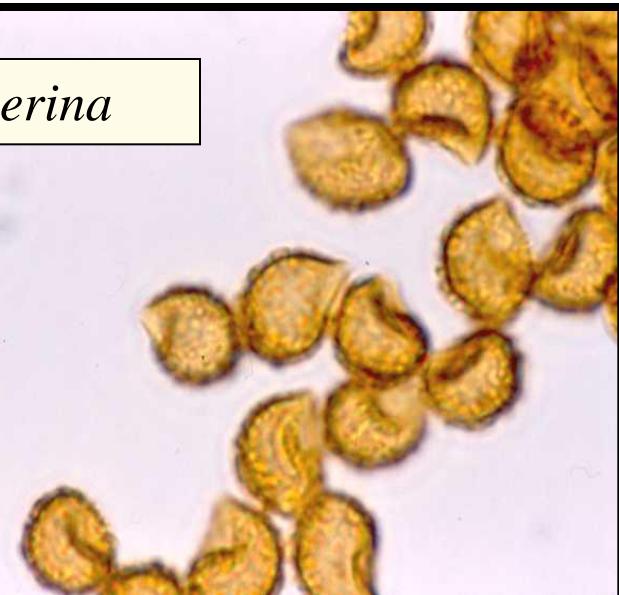
Thelephora

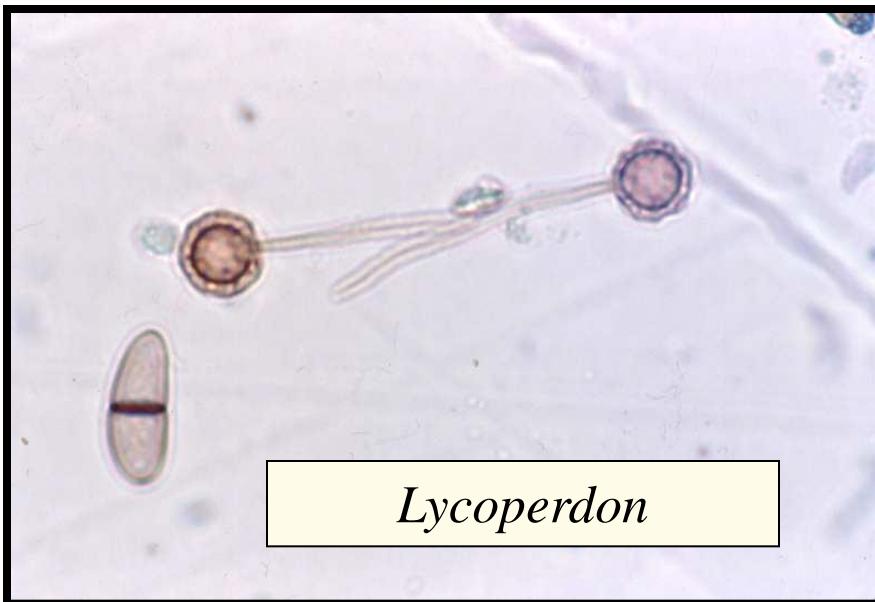


Chlorophyllum

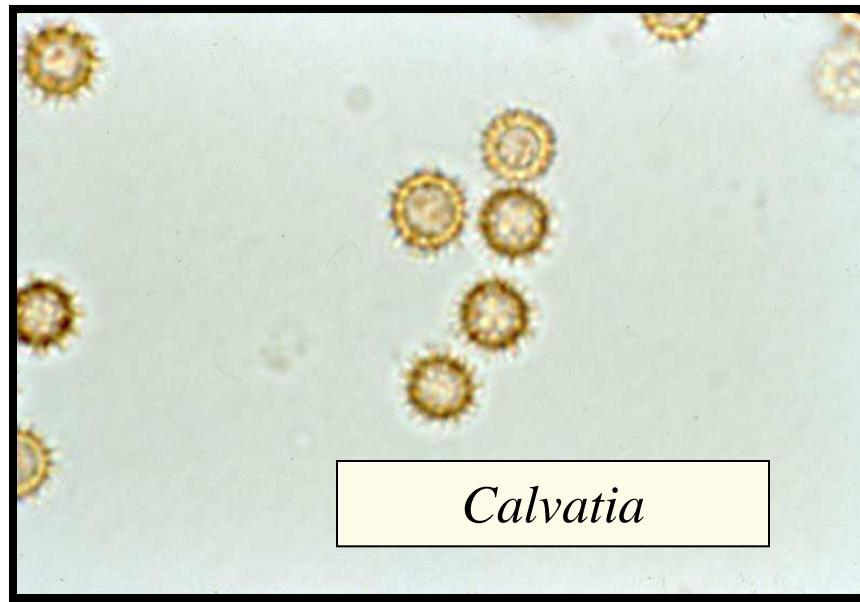


Galerina

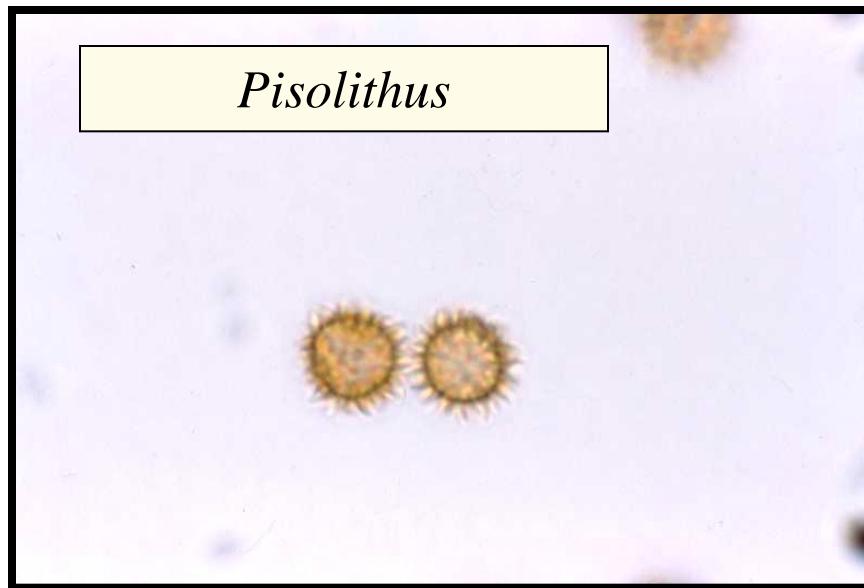




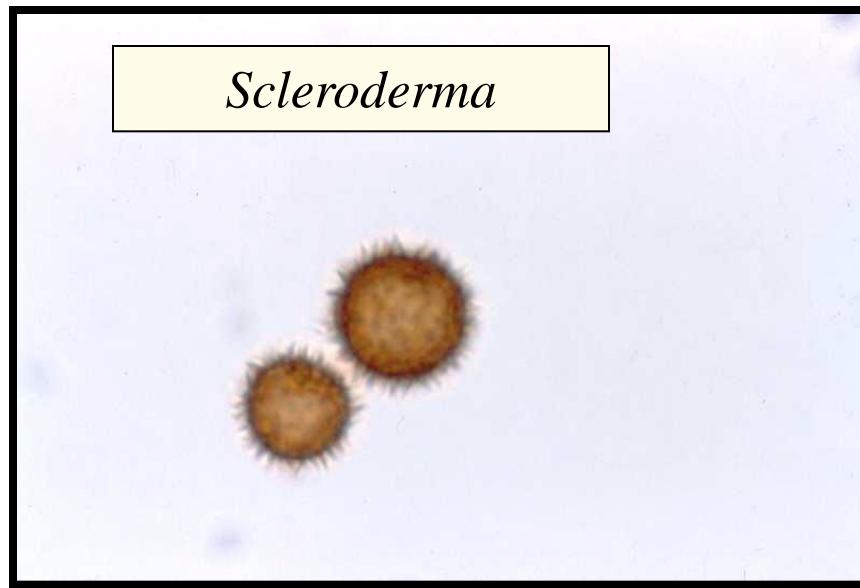
Lycoperdon



Calvatia



Pisolithus



Scleroderma

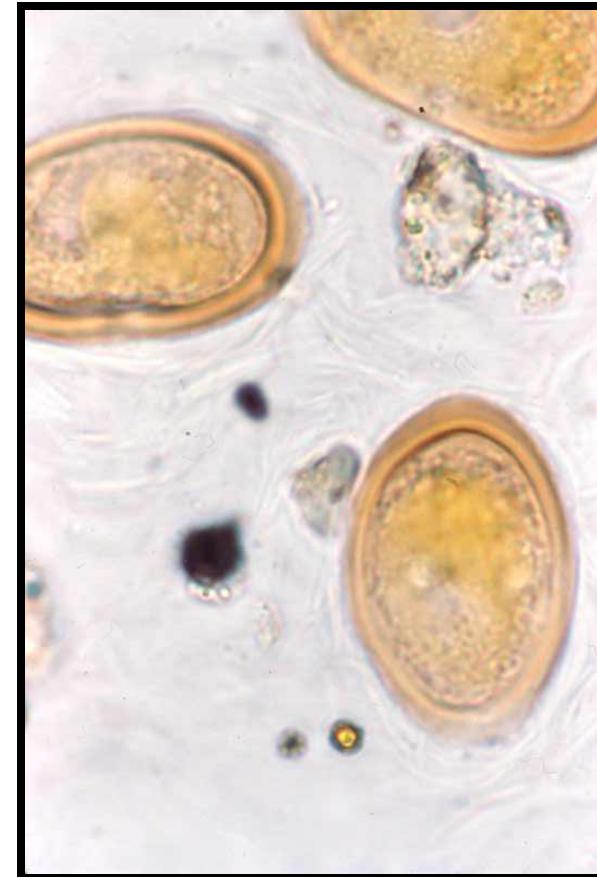
Mixed Basidiospores



Rust spores: *Puccinia*

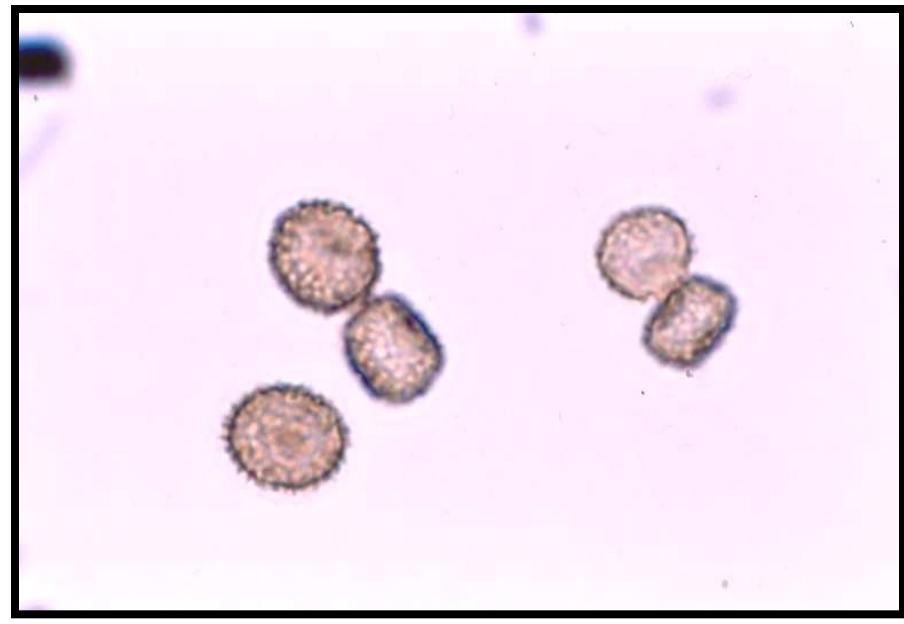


Puccinia uredospores



Puccinia teliospores

Smut Spores

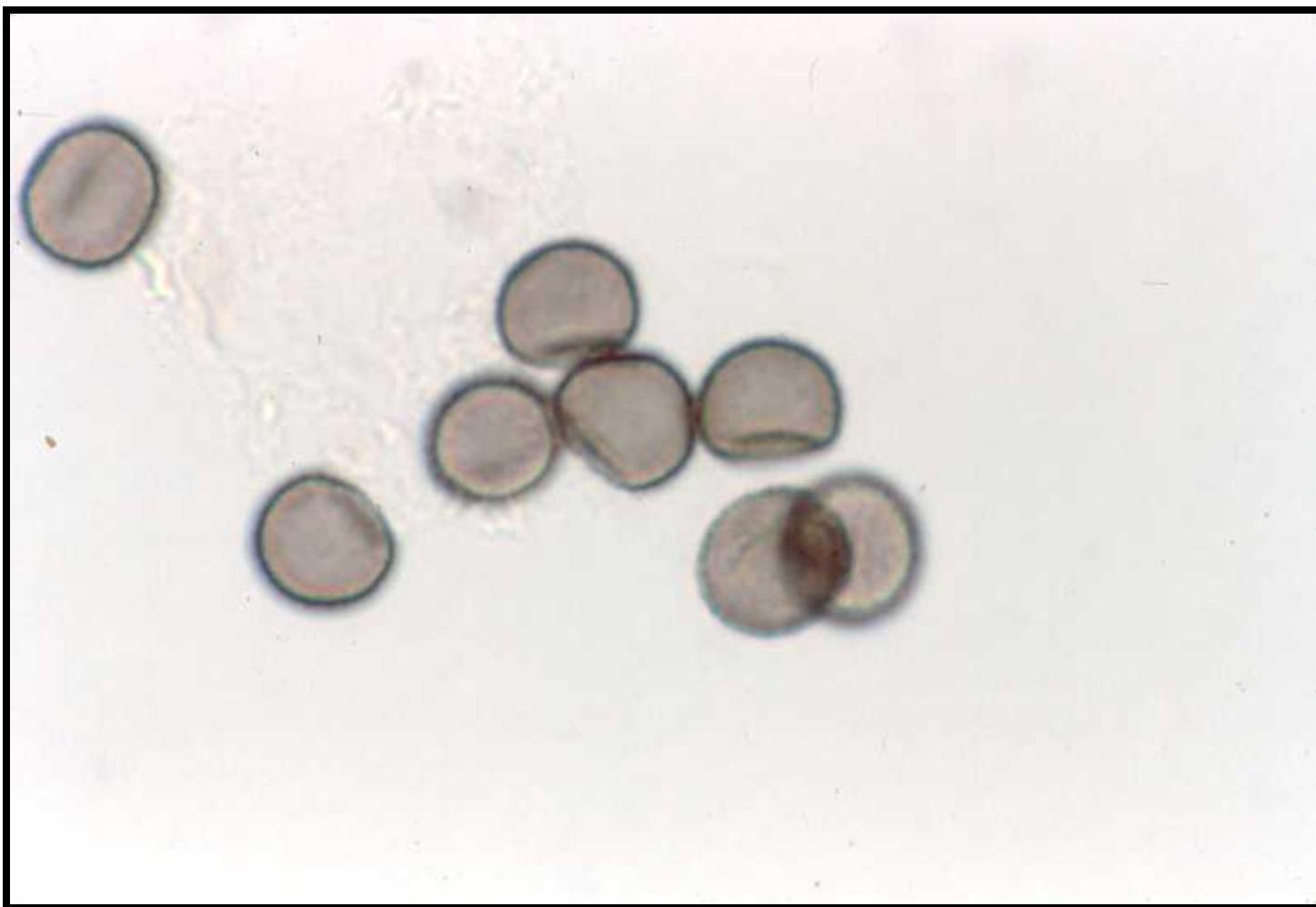




Smut Spores



Myxomycete (slime mold) spores



Other slime mold spores

