



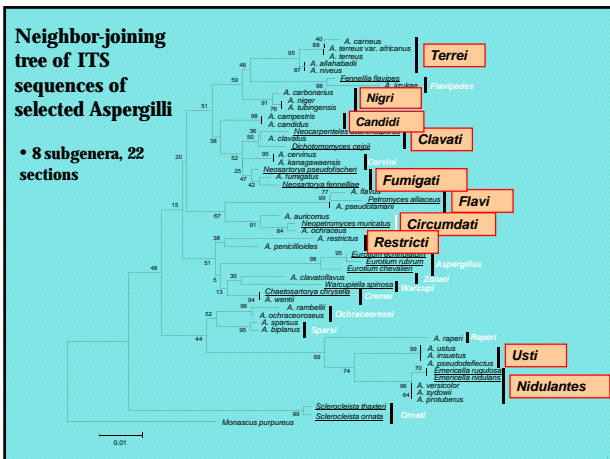
Identification of *Aspergillus*

Aspergillus

- a common genus with approx. 300 species
- several ascomycetous teleomorphs
- has preference for warmer climates
- important for biotechnology, producers of mycotoxins and opportunistic human pathogens

Nomenclature of infrageneric taxa of the genus *Aspergillus* (group-names following the classification of Raper and Fennell, 1965)

Subgenus	Section
<i>Aspergillus</i>	<i>Aspergillus</i> (<i>A. glaucus</i> -group) <i>Restricti</i> (<i>A. restrictus</i> -group)
<i>Fumigati</i>	<i>Fumigati</i> (<i>A. fumigatus</i> -group) <i>Cervini</i> (<i>A. cervinus</i> -group)
<i>Ornati</i>	<i>Ornati</i> (<i>A. ornatus</i> -group)
<i>Clavati</i>	<i>Clavati</i> (<i>A. clavatus</i> -group)
<i>Nidulantes</i>	<i>Nidulantes</i> (<i>A. nidulans</i> -group) <i>Versicolor</i> (<i>A. versicolor</i> -group) <i>Usti</i> (<i>A. ustus</i> -group) <i>Terrei</i> (<i>A. terreus</i> -group)
<i>Circumdati</i>	<i>Flavipedes</i> (<i>A. flavipes</i> -group) <i>Wentii</i> (<i>A. wentii</i> -group) <i>Flavi</i> (<i>A. flavus</i> -group) <i>Nigri</i> (<i>A. niger</i> -group) <i>Circumdati</i> (<i>A. ochraceus</i> -group) <i>Candidi</i> (<i>A. candidus</i> -group) <i>Cremeri</i> (<i>A. cremerus</i> -group) <i>Sparsi</i> (<i>A. sparsus</i> -group)

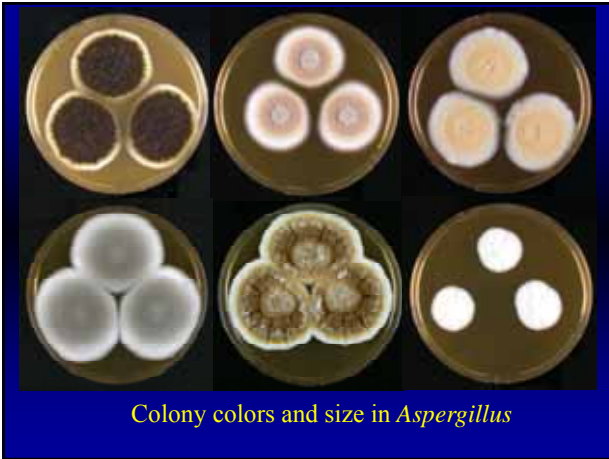


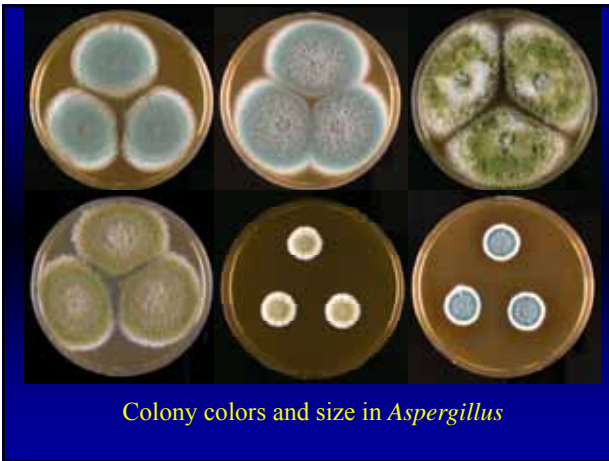
Ascomycetous genera with an *Aspergillus* anamorph

<i>Aspergillus</i> anamorph	Teleomorph
Section <i>Aspergillus</i> :	<i>Eurotium</i> Link:Fr.
Section <i>Fumigati</i> :	<i>Neosartorya</i> Malloch & Cain.
Section <i>Ornati</i> :	<i>Warcupia</i> Subram., <i>Scleroacleista</i> Subram., <i>Hemicarpeniteles</i> Sarbhoy & Elphick
Section <i>Nidulantes</i> :	<i>Emericella</i> Berk. & Br.
Section <i>Flavipedes</i> :	<i>Fennellia</i> Wiley & Simmons
Section <i>Circumdati</i> :	<i>Neopetromyces</i> Frisvad & Samson
Section <i>Flavi</i> :	<i>Petromyces</i> Malloch & Cain
Section <i>Cremeri</i> :	<i>Chaetosartorya</i> Subram.

Overview identification criteria

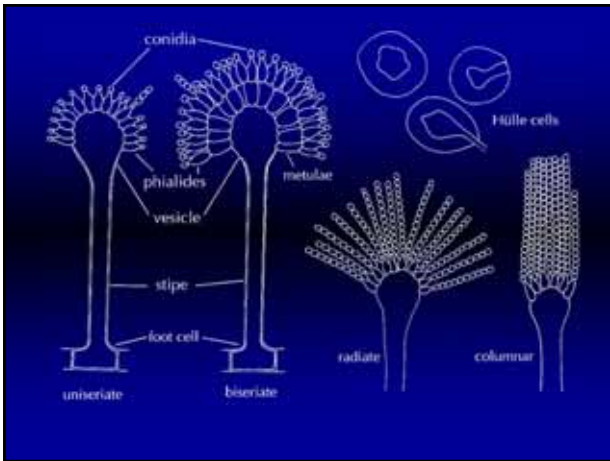
- Macro-morphology:
 - Colony color
 - Colony size
- Micro-morphology
- Molecular based identification (sequencing)

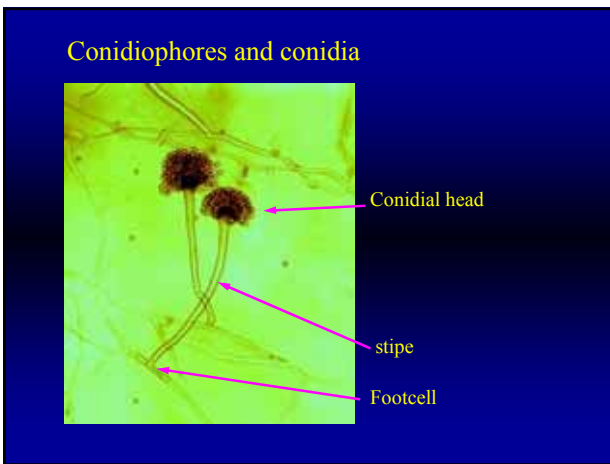




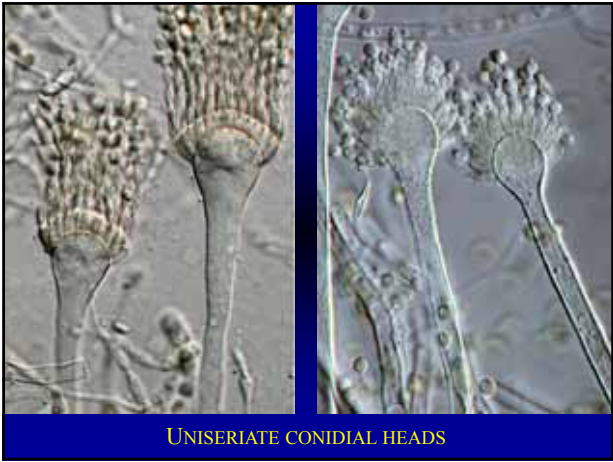
Micro-morphological criteria

- conidiophores and conidia
- columnar or radiate conidial heads
- Hülle cells
- ascospores
- ascospores





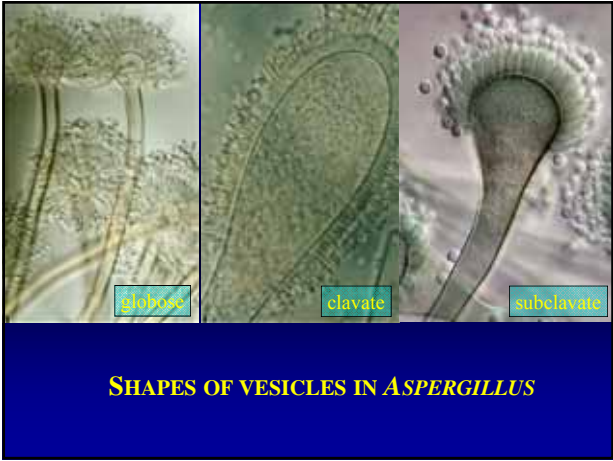




UNISERIATE CONIDIAL HEADS



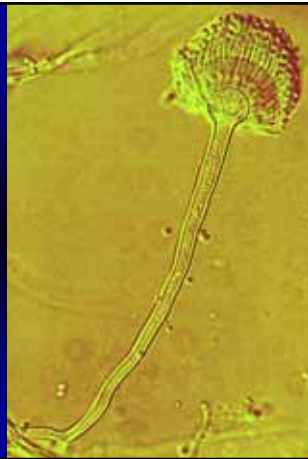
BISERIATE CONIDIAL HEADS

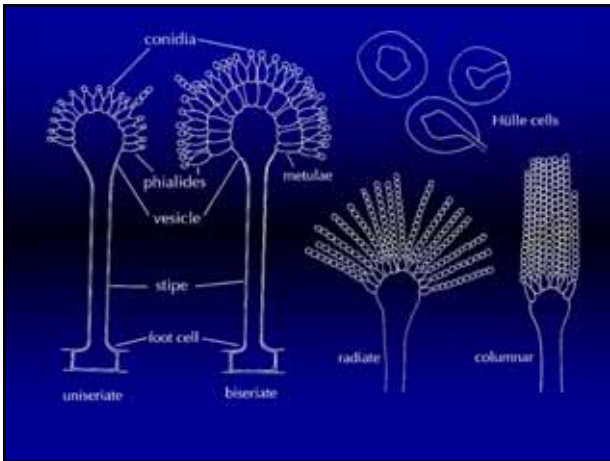


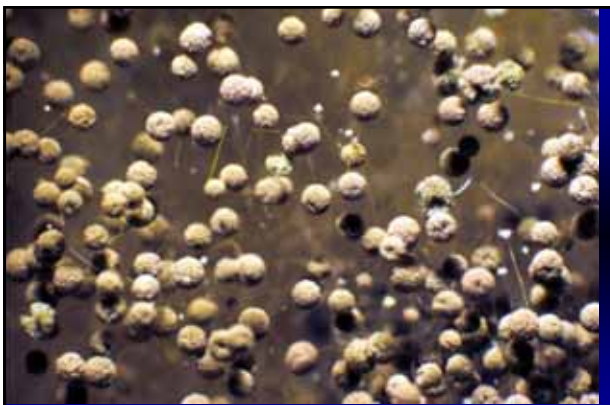
SHAPES OF VESICLES IN *ASPERGILLUS*

Micro-morphological criteria

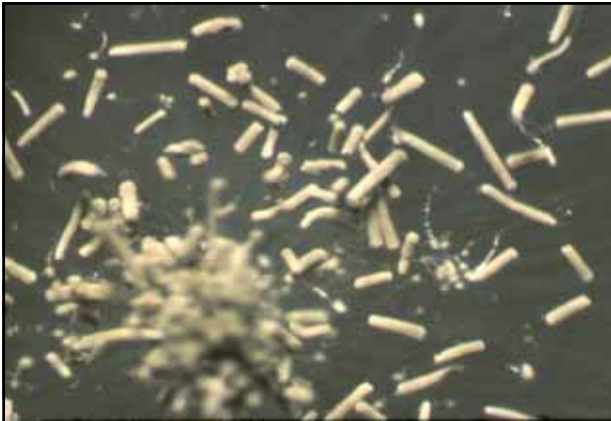
- conidiophores and conidia
- columnar or radiate conidial heads
- Hülle cells
- ascomata
- ascospores



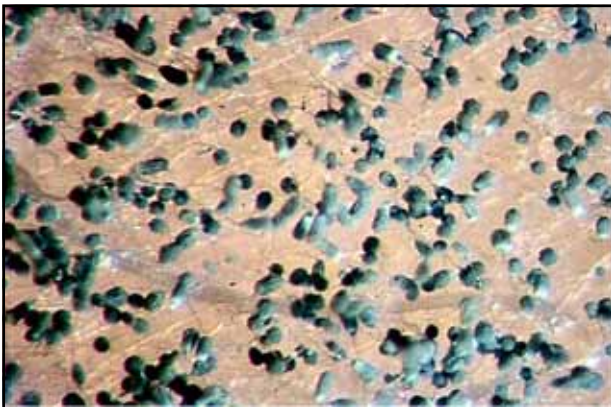




RADIATE CONIDIAL HEADS



COLUMNAR CONIDIAL HEADS



COLUMNAR CONIDIAL HEADS

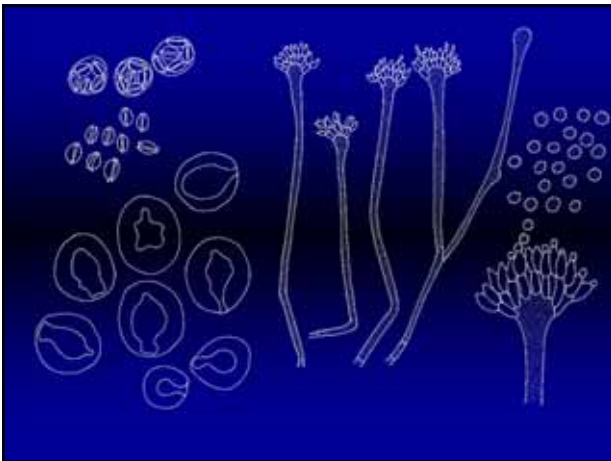


RADIATE CONIDIAL HEADS SPLITTING INTO COLUMNS

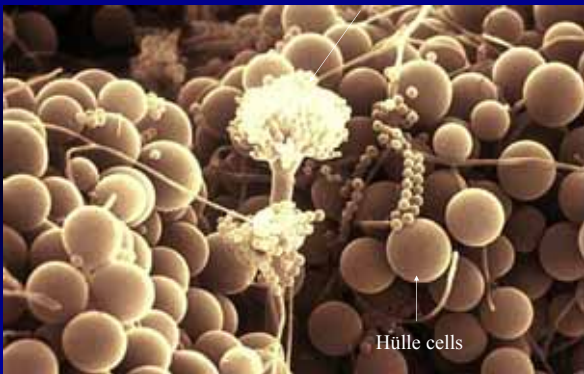
Micro-morphological criteria

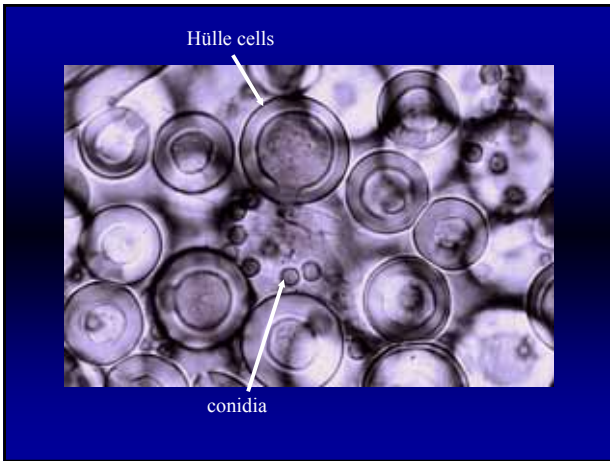
- columnar or radiate conidial heads
- conidiophores and conidia
- Hülle cells
- ascomata
- ascospores

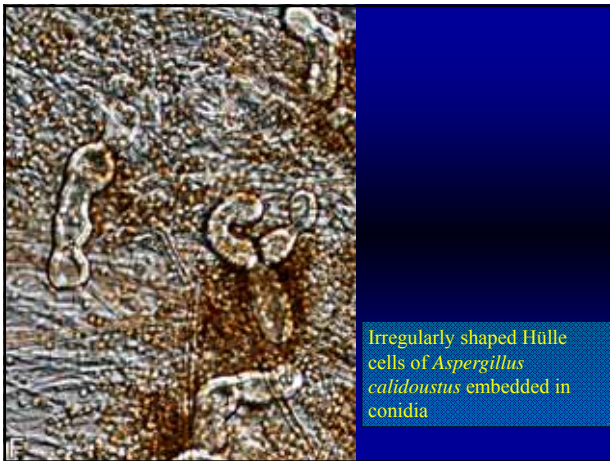




Emericella nidulans Anamorph: *Aspergillus nidulans*



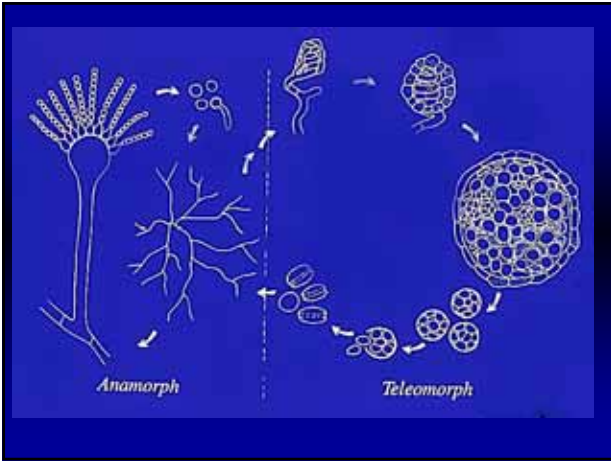




Micro-morphological criteria

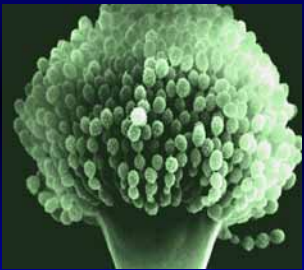
- columnar or radiate conidial heads
- conidiophores and conidia
- Hülle cells
- **ascmata**
- **ascospores**


A light micrograph showing a single, large, spherical radiate conidial head of Aspergillus. The head is composed of many small, radiating conidia. It is attached to a long, thin, columnar conidiophore. The background is a solid blue color.



Example:
Aspergillus fumigatus

- mostly not common in indoor environments
- important in clinical environments
- incubation temperature important

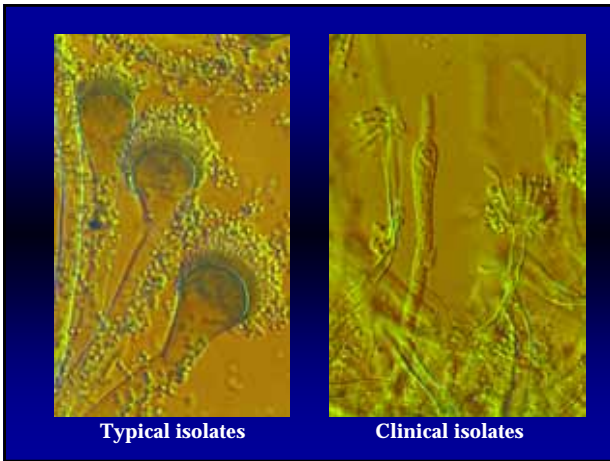




B

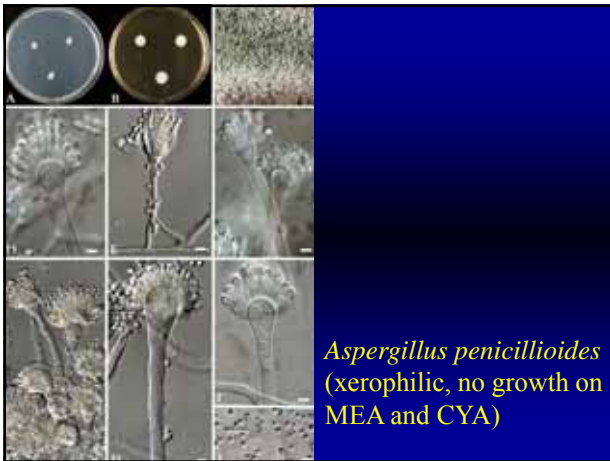
Blue green colony
Growing fast
Covering the disk
In 5-7 days at 37°C

Typical columnar heads

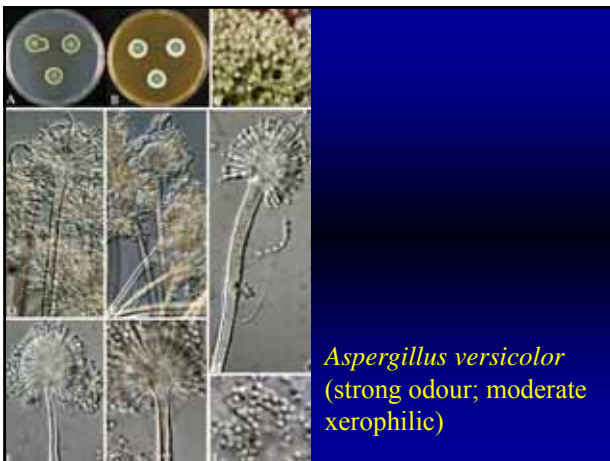


Typical isolates

Clinical isolates



Aspergillus penicillioides
(xerophilic, no growth on MEA and CYA)

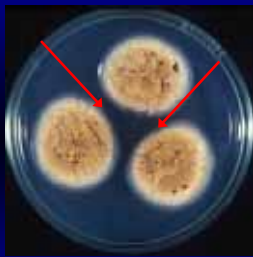


Aspergillus versicolor
(strong odour; moderate xerophilic)

MEDIA FOR IDENTIFICATION

- Malt Extract Agar (MEA) for macro- and micro morphology
- Czapek Yeast Agar (CYA) for colony color and size
- For xerophilic Aspergilli: MEA and CZ with 20% sucrose
- Incubation temperature: 25°C
- Incubation time: 7 days (or longer)
- 3 point position

Microscopic preparation of *Aspergillus*



Lactic acid with aniline blue/cotton blue
Drop of alcohol
Preparations should be made from Malt Extract Agar

IDENTIFICATION CRITERIA

- Macro-morphology
 - Colony color
 - Colony size
- Micro-morphology
 - Columnar or radiate conidial heads
 - Conidial heads: uni- or biseriata
 - Hulle cells
 - (Ascomata, ascospores)
- Molecular based identification (sequencing)
