

STRUCTURE, CHARACTERISTICS AND REPRODUCTION OF FUNGI I

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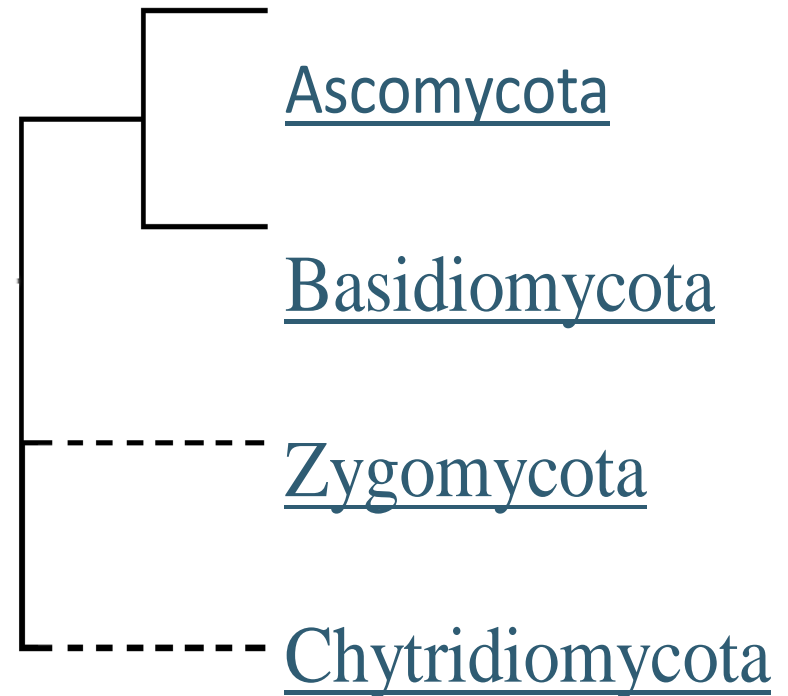
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Introduction

Most people know that fungi include mold and mushrooms, but are there other groups that we don't think about immediately? Yes, and they can be strange and interesting. Look at the diagram below:



The phylogram above shows the main groups of fungi and can be interpreted in the next slide.

Ascomycota (ascomycetes pronounced ask-oh-my-seats)

Ascomycetes naturally exist in varied shapes and sizes.



Typical cup-shaped Ascomycete fruiting body. This is a species of *Galiella*.

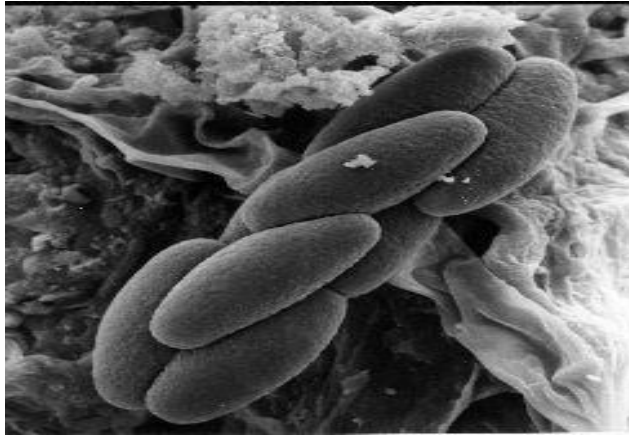
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Paecilomyces
species fruiting
from insect
carcass,
courtesy of P.B.
Matheny

Ultra-structure of Ascomycetes



Ascomycetes are named for the ascus, an 8-spored sac which is used for spore dispersal. (Hence the common name, sac-fungi) In this scanning electron micrograph the ascus coat is peeled away revealing 8 spores (Note: This is not a rule for Ascomycetes). Many Ascomycetes are known for their large, beautifully-decorated spores.

Basidiomycota

(basidiomycetes pronounced buh-sid-ee-oh-my-seats)



Basidiomycetes include most of the fruiting bodies you would call "mushrooms". They can often form skins or sheets, generally on decaying wood. Basidiomycetes usually produce spores. They are named for the basidium, a club-shaped structure that presents the spores. There are a variety of other shapes in this group, however.

Basidiomycetes usually produce spores in gills (A) or in pores (B).

A



Photo courtesy of P.B. Matheny

B



Photo courtesy of P.B. Matheny



The bracket is a common form.

Laetiporus sulfureus
from *Fungi of Japan*

Source:
Yama Kei
Publishers
Co. Ltd.

Ultra-structure of Basidiomycetes



They are named for the basidium , a club-shaped structure that presents the spores. The "club fungi" which are mushrooms shaped like clubs, are in this group. Some people call all basidiomycetes "club fungi" because of the basidium.

Basidiomycota and **Ascomycota** are more closely related to one another than either is to Zygomycota or Chytridiomycota. It can also be said that all of the Basidiomycetes and Ascomycetes share a common ancestor that is not shared with the other groups. The branches leading to Zygomycota and Chytridiomycota are dashed to show that there is more than one lineage in these groups. The relationships within these two groups is not well understood.

Zygomycota (zygomycetes pronounced zie-go-my-seats)



SEM courtesy of George Barron

Scanning Electron Micrograph of a Zygosporangium by George Barron

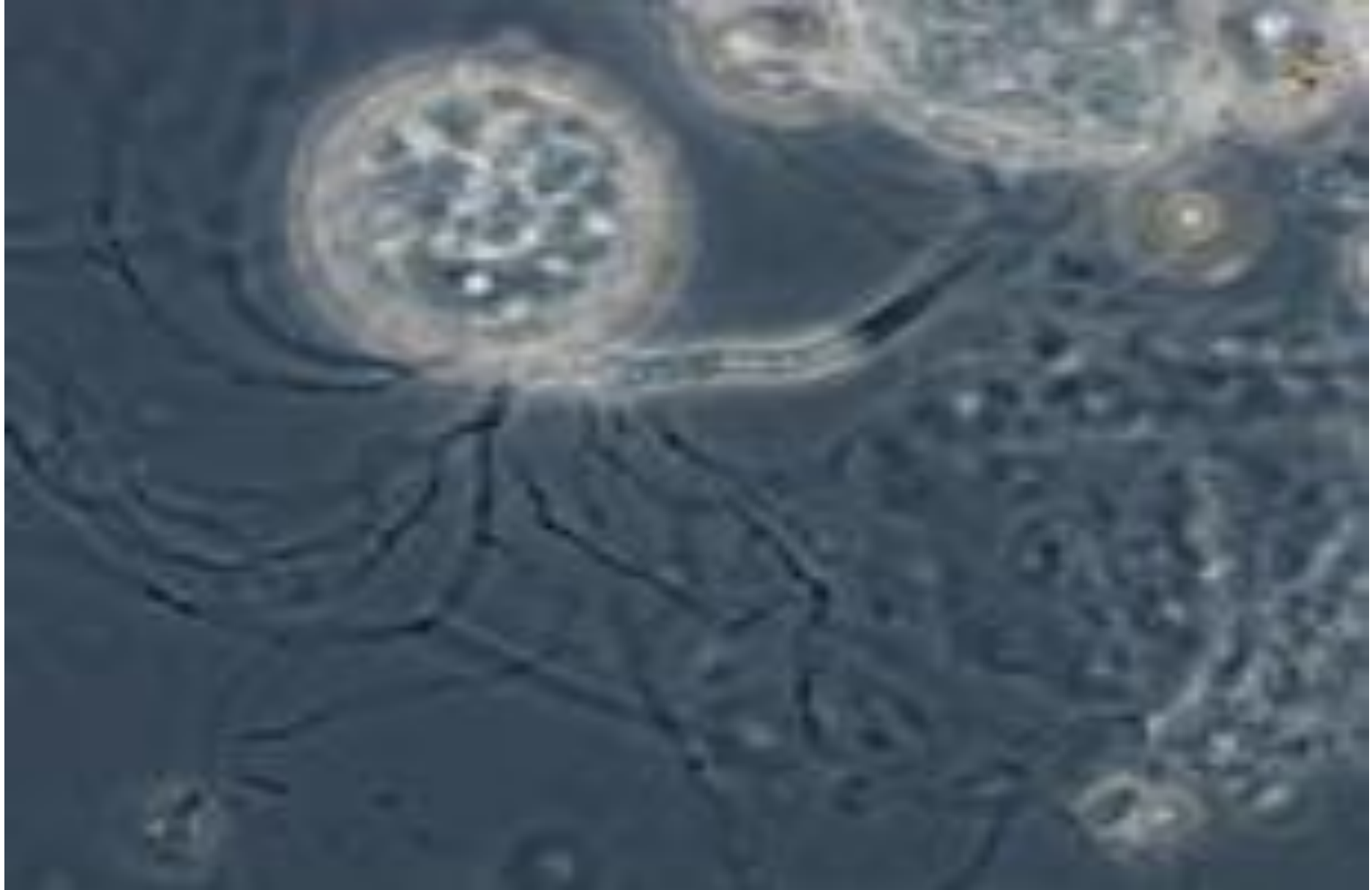
Most of the about 1,000 known Zygomycetes are terrestrial.

They are filamentous, but have no multicellular fruitbody.

Instead, they form zygospores that are left behind in the soil where two compatible hyphae meet.

The morphologically similar Glomeromycota, which are very important to rainforest ecology have been put in this group traditionally, however they represent a separate lineage that is closer to the Basidiomycota and Ascomycota.

Chytridiomycota (chytrids pronounced kih-tridz)



Chytrid Sporangium by David Patterson and Aimlee Laderman, 2001.

About 1,000, mostly aquatic species of Chytrids are known. They can be unicellular or filamentous, and can have motile zoospores which swim to new substrates. It is convenient to compile these simplest of fungi at the base of the fungus tree into one group, however, it is becoming clear that there are multiple groups of Chytrids.

Table 1. Summary of Unique properties of the four fungal groups

	Motile (move with flagella/undulipodia)	habitat	cell organization	Reproductive structures	# species known	<u>septa</u> between cells
<u>Chytrids</u>	yes	mostly aquatic	<u>Unicellular</u> or <u>filamentous</u>	microscopic <u>sporangium</u>	~1000	no
<u>Zygomycetes</u>	no	mostly terrestrial	filamentous	<u>zygospores</u>	~1000	no
<u>Ascomycetes</u>	no	mostly terrestrial	filamentous or unicellular (<u>yeast</u>)	Multicellular fruiting bodies (some <u>mushrooms</u>) or asexual spores	~45,000	yes
<u>Basidiomycetes</u>	no	mostly terrestrial	filamentous or unicellular	Multicellular fruiting bodies (mushrooms) or asexual spores	~22,000	yes, often with clamp connections