Phylum: Basidiomycota

Class: Basidiomycetes
Class: Urediomycetes
Class: Ustomycetes

Class: Basidiomycetes

- Basidia and basidiospores borne in basidiocarp.
- Includes mushroom (= Agaricales).
- Classification of orders based on basidium, basidiocarp morphology and basidiospore dispersal.
- Basidiospores forcibly ejected from basidium, except Gasteromycetes (puff balls).

Class: Basidiomycetes

- The mushroom will be used as the representative life cycle for the class.

Class: Basidiomycetes

- Germination of basidiospores forms monokaryon.
- Plasmogamy of monokaryons form dikaryon.

Dikaryon is the mycelium that forms the basidiocarp. Thus, basidiocarp is dikaryotic.

- Only dikaryotic cells forming layer on edge and side of lamella, will form basidia and basidiospores.
- Fertile layer is the hymenium.
**Class: Basidiomycetes**

- Karyogamy occurs only in hymenial cells to form zygote.

- Hymenium, in part

- Karyogamy

**Class: Basidiomycetes**

- Zygote undergoes meiosis, immediately, following karyogamy.

- Basidiospores form on sterimata, basidiospores formation, nuclei migration.

- Zygotes

**Class: Basidiomycetes**

- Clamp connections were present in dikaryon in example given.

- Present in many species of Basidiomycetes.

- Formation of clamp connection has a function.

**Class: Basidiomycetes**

- Clamp connections formation:
  - Clamp formation begins
  - Elongation of hyphal tip
  - Migration of one nucleus into clamp

**Class: Basidiomycetes**

- Variation exist in the type of basidiocarp and basidia produced.

- Variations not meaningful, with respect to phylogeny.

- Variations of basidiocarp, in the order: Aphyllophorales.
Order: Aphyllophorales

- *Pycnoporus sanguineus*, a "bracket" fungus, has pored hymenium.
- Basidia and basidiospores borne in pores.

Order: Aphyllophorales

- *Ganoderma applanatum*, another example of pored hymenium.
- Also called the artist fungus.

Order: Aphyllophorales

- *Laetiporus sulphureus*, another species of pored hymenium.

Order: Aphyllophorales

- *Ramaria fragilima*, a coral fungus. Basidia and basidiospores are borne on the tips of the basidiocarp.
- "Spined" or "toothed" hymenium

Order: Agaricales

- *Amanita marmorata*, a mushroom, with "gilled" hymenium

Order: Agaricales

- *Amanita muscaria*, a very distinctive mushroom.
Suillus salmonicolor is also a member of the Agaricales, but has pores instead of gills.

Class: Basidiomycetes
Gasteromycetes
(Puff Balls)

Gasteromycetes

Lack hymenium
Basidiospores not forcibly ejected from basidium.
Various mechanisms evolved to disperse basidiospores.

Gasteromycetes

Lycoperdon pyriforme

Gasteromycetes

Lycoperdon has a flexible peridium. When pressure applied by small mammal or raindrop, basidiospores "puffed" into air.

Gasteromycetes

Another species in Lycoperdales
Geastrum tripex (Earth Star): same dispersal mechanism as Lycoperdon.
Gasteromycetes

Phallales (Stink Horns)
- Aseroe Rubra: Bright color and foul odor attract flies.

Aseroe rubra

Gasteromycetes

Dictyophora cinnabarina, another stinkhorn.

Order: Nidulariales (Birds Nest Fungi)
- Cyathus disperses its basidiospores within the “eggs” of the fungus by a rain-drop splash mechanism.

Nidulariales Dispersal Mechanism

- Impact will splash out a peridiole ("egg") a short distant.

Nidulariales Dispersal Mechanism

- Funiculus unravels and wraps around substrate after hapteron sticks onto substrate.
Class: Basidiomycetes

- Relationship between some mushrooms and puffballs.
- Genera exist that are morphologically intermediate between mushrooms and puffballs.
- Such fungi are referred to as secotioid fungi.

Example of Relationships

- *Coprinus comatus* (Shaggy Mane): A common temperate species.

Example of Relationships

- *Podaxis pistillaris*, a secotioid species.
- Cap does not open, lacks hymenium, basidiospores not ejected.

Example of Relationships

- *Laccaria fraterna*: A small common species in Hawai‘i.

Example of Relationships

- *Hydnangeum carneum*: A less common secotioid fungus that also occurs in Hawai‘i.
- Microscopically same as *Laccaria*.

“Jelly Fungi”
Jelly Fungi
- Septate or deeply lobed basidia.
- Classification based on basidium morphology.
- Orders of Jelly Fungi:
  - Auriculariales
  - Tremellales
  - Dacrymycetales

Auriculariales
- Auricularia cornea (pepeiao)
- Basidium transversely septate.

Tremellales
- Tremella fuciformis
- Basidium cruciate septate.

Dacrymycetales
- Calocera cornea
- Tunning Ford Basidium