

# CHAPTER 31: FUNGI

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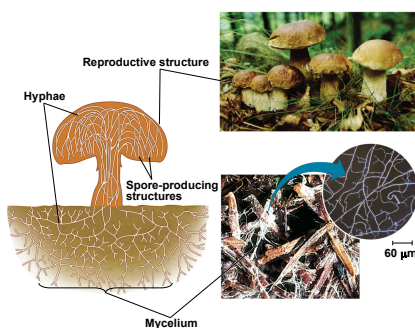


1

## FUNGI FACTS

- Essential for well-being of terrestrial ecosystems because they break down organic material and recycle nutrients
- Heterotrophs that feed by absorption
  - Secrete exoenzymes into their surroundings to break down complex molecules and absorb the remaining smaller compounds
- Function as decomposers, parasites, and mutualistic symbionts
  - Micorrhizae - mutually beneficial relationships between fungi and plant roots

Fig. 31.2



- Morphology of multicellular fungi enhances their ability to absorb nutrients from their surroundings

2

## MYCELIA

- Fungi have cell walls made of chitin.
- Fungi consist of mycelia (networks of branched hyphae adapted for absorption)
  - Some fungi have hyphae divided into cells by septa with pores allowing cell-to-cell movement of materials
  - Coenocytic fungi lack septa
- Some fungi have specialized hyphae that allow them to penetrate the tissues of their host

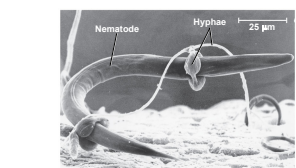
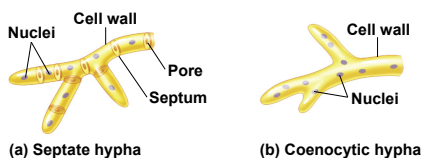
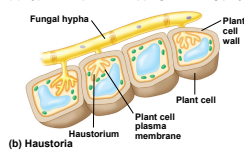


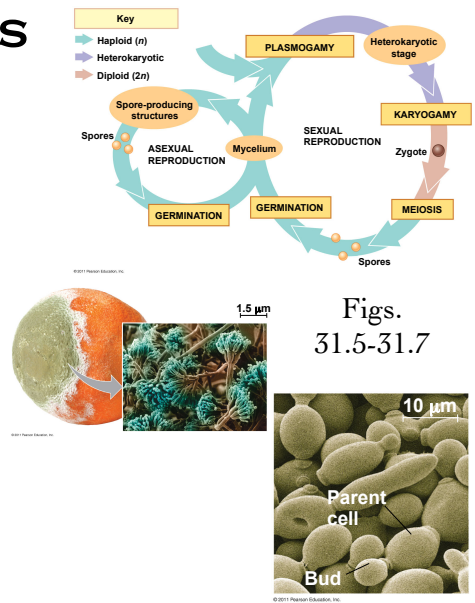
Fig. 31.3 & 31.4



3

# LIFE CYCLES

- Fungi produce spores either sexually or asexually
- Sexual life cycle involves cell fusion (plasmogamy) and nuclear fusion (karyogamy)
- Diploid phase following karyogamy is short and undergoes meiosis to produce haploid spores
- Many also can reproduce asexually (mold and yeast)
- Some only reproduce asexually



Figs. 31.5-31.7

4

# FUNGI EVOLUTION

- Descended from an aquatic, single-celled, flagellated protist
- Fungi and Animalia are very closely related kingdoms (more closely related than plants or other eukaryotes)
- Molecular evidence shows that fungi and animals diverged from a common ancestor that was unicellular and had flagella (before colonization of land by multicellular organisms)
- Oldest fossils are 460 million years old
- Earliest colonizers of land (probably symbionts with plants)

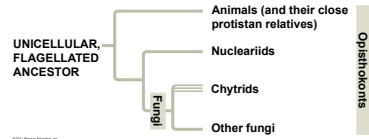
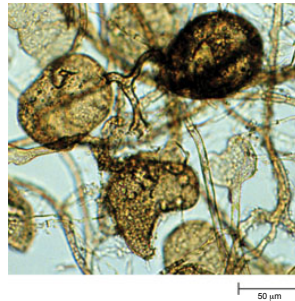


Fig. 31.8 & 31.9



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# PHYLOGENY OF FUNGI

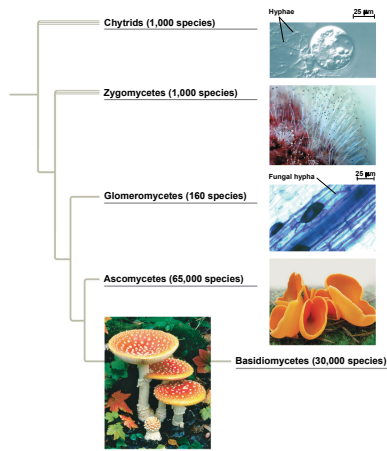
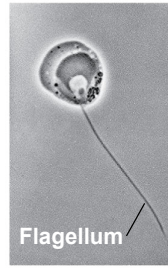


Fig. 31.11

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# PHYLUM CHYTRIDIOMYCOTA

- ☼ Found in freshwater and terrestrial habits
- ☼ Can be saprobic or parasitic
- ☼ Chytrids have flagellated spores called zoospores



4 μm

Fig. 31.12

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# PHYLUM ZYCOMYCOTA

- ☼ Diversity of life histories
- ☼ Include fast growing molds, parasites, and commensal symbionts
- ☼ Named for sexually produced zygospores
- ☼ Some can aim their sporangia toward good food sources
- ☼ Resistant to freezing and drying (undergo meiosis when conditions improve)
- ☼ Microsporidia are unicellular parasites of animals and protists

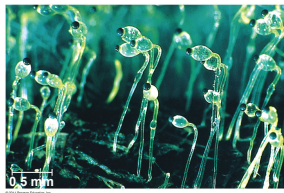
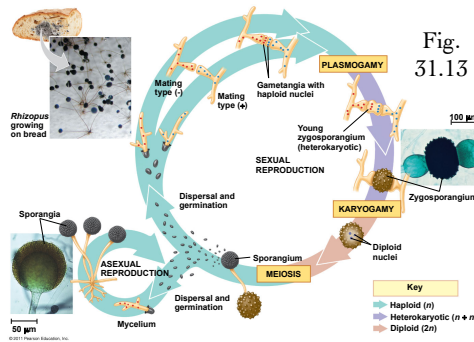


Fig. 31.14



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# PHYLUM GLOMEROMYCETES



- ☼ Form a distinct type of endomycorrhizae called arbuscular mycorrhizae

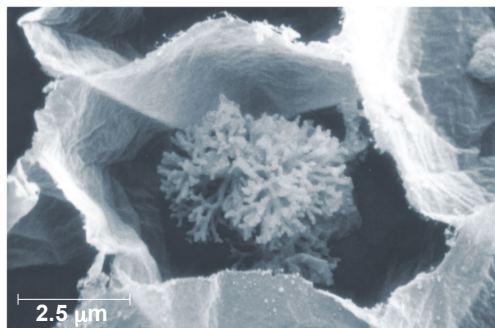


Fig. 31.15

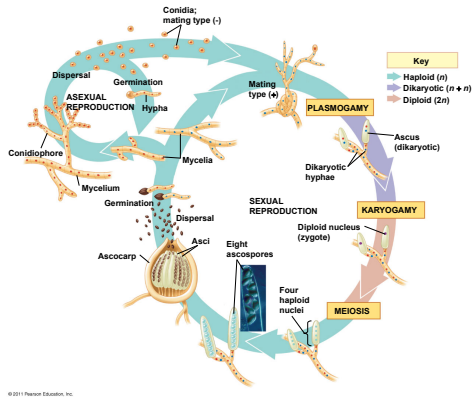
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# PHYLUM ASCOMYCOTA

- Found in marine, freshwater, and terrestrial habitats
- Produce sexual spores in saclike asci
- Contained in fruiting bodies called ascocarps
- Reproduce by producing many asexual spores called conidia



Fig. 31.16-31.17



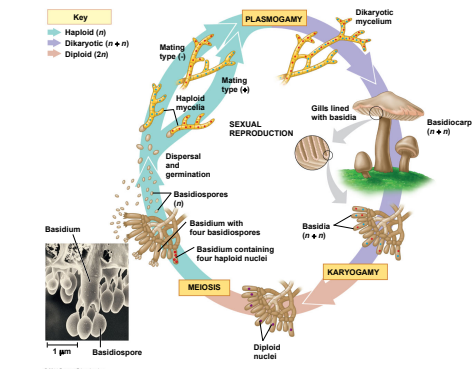
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# PHYLUM BASIDIOMYCOTA

- Include mushrooms and shelf fungi
- Defined by a clublike structure called a basidium (transient diploid stage in the life cycle)
- Life cycle includes long-lived dikaryotic mycelium which can produce a fruiting structure (mushroom) in just a few hours



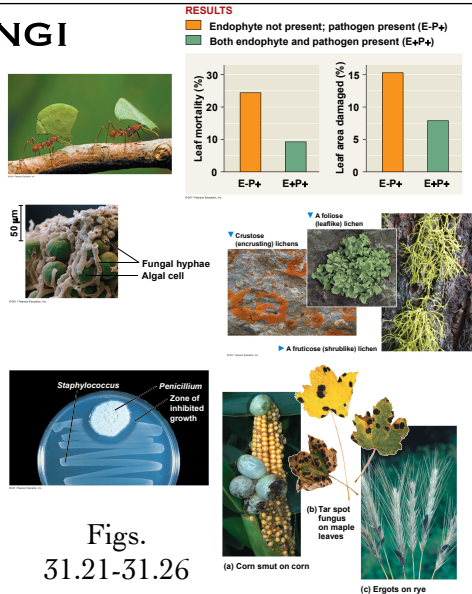
Figs. 31.18 & 31.19



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# IMPACT OF FUNGI

- Decomposers
- Symbionts (ex. Mycorrhizae)
  - Some share digestive services with animal
  - Guts of grazing mammals (ex. cows)
  - Some ants and termites raise fungi in farms
  - Lichens - millions of photosynthetic microorganisms held in a mass of fungal hyphae
- Pathogens (30% of fungal species are parasites (mostly of plants))
- Food (used to make cheese, alcoholic beverages, and bread)
- Antibiotics to treat bacterial infections
- Genetic Research



Figs. 31.21-31.26

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