
Topic: The Diversity of Fungi

Reading: Chapter 22

Main concepts:

- Fungi include both unicellular and multicellular non-motile heterotrophs. Most fungi are decomposers: they obtain their nutrients and energy by chemically breaking down and absorbing dead material (external digestion). Some parasitize living organisms.
- The main fungal organism is a mass of individual cells called hyphae. This mass is called mycelium. A familiar “mushroom” is the reproductive structure of a larger fungal organism in the soil.
- Fungal cells are often very long, multinucleated, and have a cell wall made of chitin (a carbohydrate).
- Fungi reproduce both sexually and asexually. Hyphae can fuse and exchange genes, forming a zygote. Fungi can also produce asexual spores.
- Four major groups of fungi:
 - Chytrids: aquatic fungi with swimming spores. Ancient chytrids probably gave rise to all current groups of fungi.
 - Zygomycetes: molds and mildews. Sporangia are small and ball-shaped.
 - Ascomycetes: “sac fungi.” Spores are made in small, elongated sacs. Many of these fungi produce a soft above-ground reproductive structure that may be leathery or jelly-like, such as morels, cup fungi, coral fungi. Bread yeast and penicillium mold are in this group as well.
 - Basidiomycetes: “club fungi.” Most fungi in this group produce familiar “mushrooms” which contain basidia (club-shaped structures bearing spores) on their gills or in pores.
- Fungi form symbiotic relationships with other organisms:
 - Lichens are composed of two organisms: a fungus and an alga which rely on each other to live.
 - Mycorrhizal fungi form associations with plant roots, essentially extending the surface area of plant roots and helping the plant absorb more water and nutrients. The fungus can take shelter inside the plant roots in harsh conditions. Many forest trees are dependent on mycorrhizal fungi.
- Fungi affect humans both positively and negatively.
 - Some fungi are pathogenic, such as “ringworm” (a fungus infection of the skin), athlete’s foot, or vaginal “yeast” infections (the “yeast” in this case is *Candida albicans*, from an entirely different group than the yeasts used in foods).
 - Yeast is a fungus used to make bread and to brew alcoholic drinks.
 - Some antibiotics are derived from fungi, which have evolved antibiotics as chemical weapons to use against other soil organisms.

Common misconceptions:

- Many students confuse fungus, mold, moss, algae, and “slime” in general. Fungus is a kingdom. Molds and mildews are specific groups of fungi. Moss is a plant, and algae are photosynthetic protists.
- Students often list fungi as producers, perhaps thinking of mushrooms as “vegetables.” Fungi are heterotrophic, not autotrophic, so they are not producers in an ecological sense.

Reading notes:

- List the key features of fungi that define the kingdom.
 - Describe the ways in which fungi reproduce.
 - List the major distinguishing features of the four major phyla of fungi: Chytrids, Zygomycetes, Ascomycetes, Basidiomycetes. List examples of each. Think about where you might encounter members of each group.
 - Describe a lichen, and the relationship between the organisms that make up a lichen.
 - Why are mycorrhizal fungi essential for the health of many ecosystems?
 - List both positive and negative effects that fungi have on human health and well-being.
 - If you are collecting edible mushrooms, why is it critical to be certain of their identification?
 - What is the evolutionary relationship between pigs and truffles that humans have exploited?
 - Describe the predatory fungus that is in the textbook.
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Notes

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Useful websites:

- “Fungi Facts and Fiction” <http://www.first-nature.com/fungi/facts/index.htm> is an introductory guide to forest mushrooms.
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