Glencoe Science

Biology

Interactive Classroom

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Mc Graw Hill Glencoe

Chapter 20 Fungi

EXIT

Click on a lesson name to select.

20.1 Introduction to Fungi

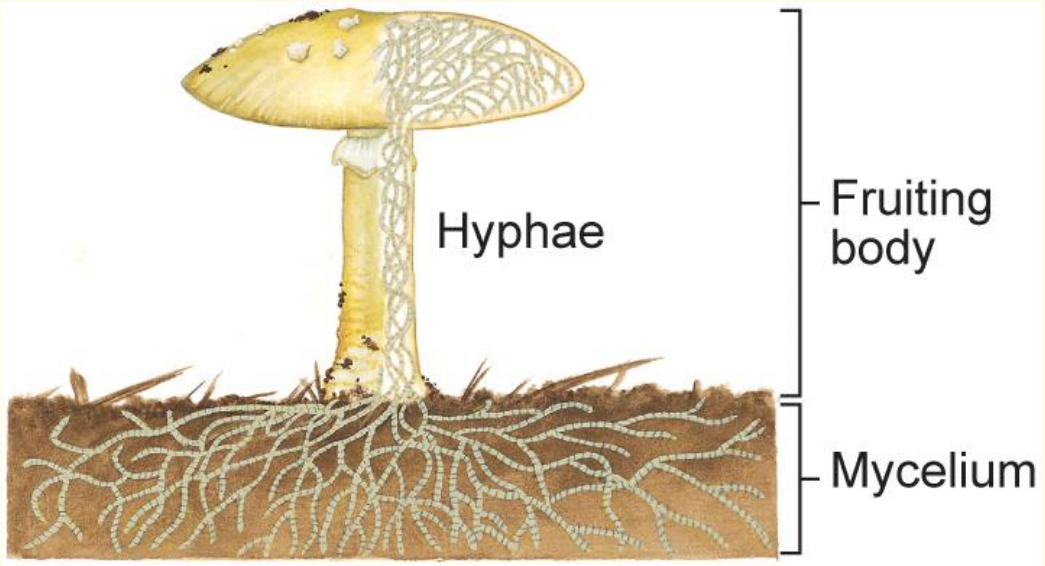
Characteristics of Fungi

- Belong to the Kingdom Fungi
- Unicellular or multicellular
- Eukaryotic heterotrophs
- Decomposers

20.1 Introduction to Fungi

Major Features of Fungi

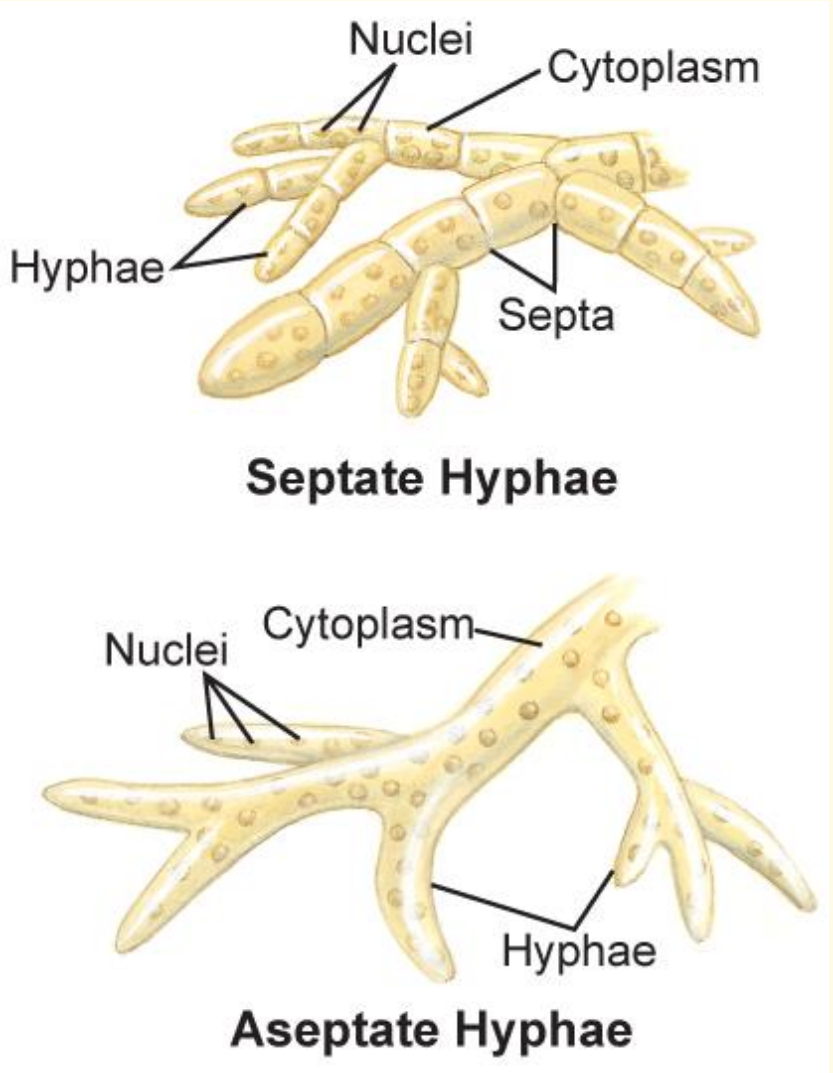
- Cell wall composed of chitin
- Hyphae form a netlike mass called a mycelium.
- Hyphae provide a larger surface area for nutrient absorption.



20.1 Introduction to Fungi

Major Features of Fungi

- Hyphae are divided into cells by cross-walls called septa.
- Septa allow nutrients, cytoplasm, and organelles to flow between cells.
- Some fungi are aseptate.



20.1 Introduction to Fungi

Nutrition in Fungi

- Three types of fungi that differ in how they obtain nutrients
  - Saprophytic fungi
  - Parasitic fungi
  - Mutualistic fungi

20.1 Introduction to Fungi

Nutrition in Fungi

- Saprophytic fungi are decomposers that recycle nutrients from dead organisms.
- Parasitic fungi absorb nutrients from the living cells of another organism.
- Mutualistic fungi live in a mutualistic relationship with another organism.

20.1 Introduction to Fungi

Reproduction in Fungi

- Fungi are classified by their structures and patterns of reproduction.
- Fungi can reproduce asexually and sexually.
- Asexual reproduction in fungi includes budding, fragmentation, and spore reproduction.
- Sexually reproducing fungi produce spores.

20.1 Introduction to Fungi

Budding

- Unicellular yeast cells reproduce asexually by budding.
- The new cell develops while attached to the parent cell.
- The plasma membrane pinches off to separate the new cell and the parent cell.

20.1 Introduction to Fungi

Fragmentation

- A form of asexual reproduction
- Occurs when the mycelium is broken apart
- If the fragments of mycelia land in a location suitable for growing, then the hyphae will grow into a new mycelia.

20.1 Introduction to Fungi

Spore Production

- The asexual and sexual life cycle of most fungi includes spore production.
- A spore develops into a new organism without the fusion of gametes.
- Spores produce new hyphae that form a mycelium.

20.2 Diversity of Fungi

Classification of Fungi

- Chytridiomycota (chytrids)
- Zygomycota (common molds)
- Ascomycota (sac fungi)
- Basidiomycota (club fungi)
- Deuteromycota (imperfect fungi)

20.2 Diversity of Fungi

Characteristics of Chytridiomycota (Chytrids)

- Unicellular
- Most are aquatic.
- Some are saprophytic.
- Produce flagellated spores

20.2 Diversity of Fungi

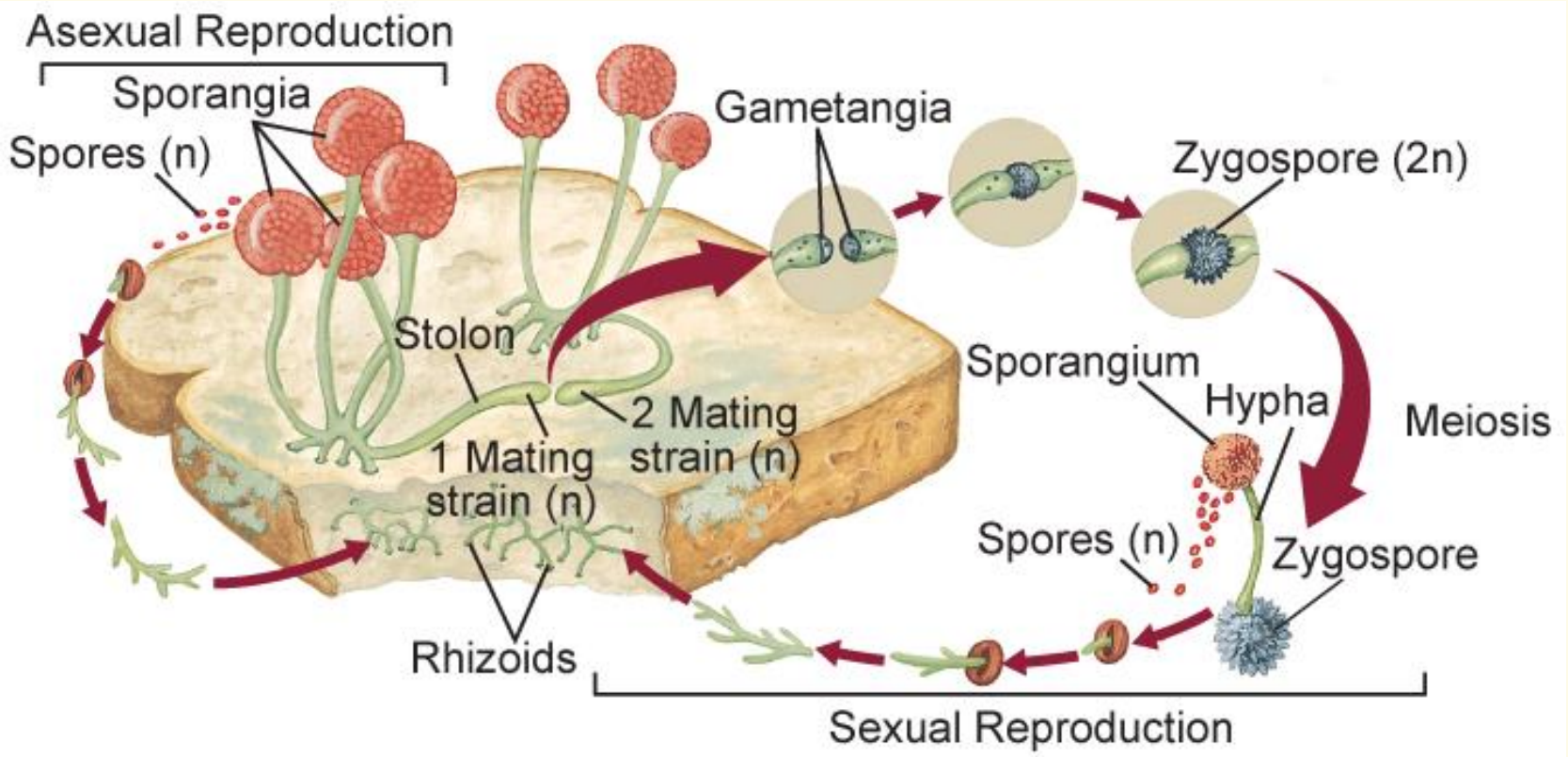
Characteristics of Zygomycota (Common Molds)

- Multicellular
- Most are terrestrial.
- Many form mutualistic relationships with plants.
- Reproduce sexually and asexually

20.2 Diversity of Fungi

Life Cycle of Zygomycota (Common Molds)

- Reproduce both sexually and asexually



20.2 Diversity of Fungi

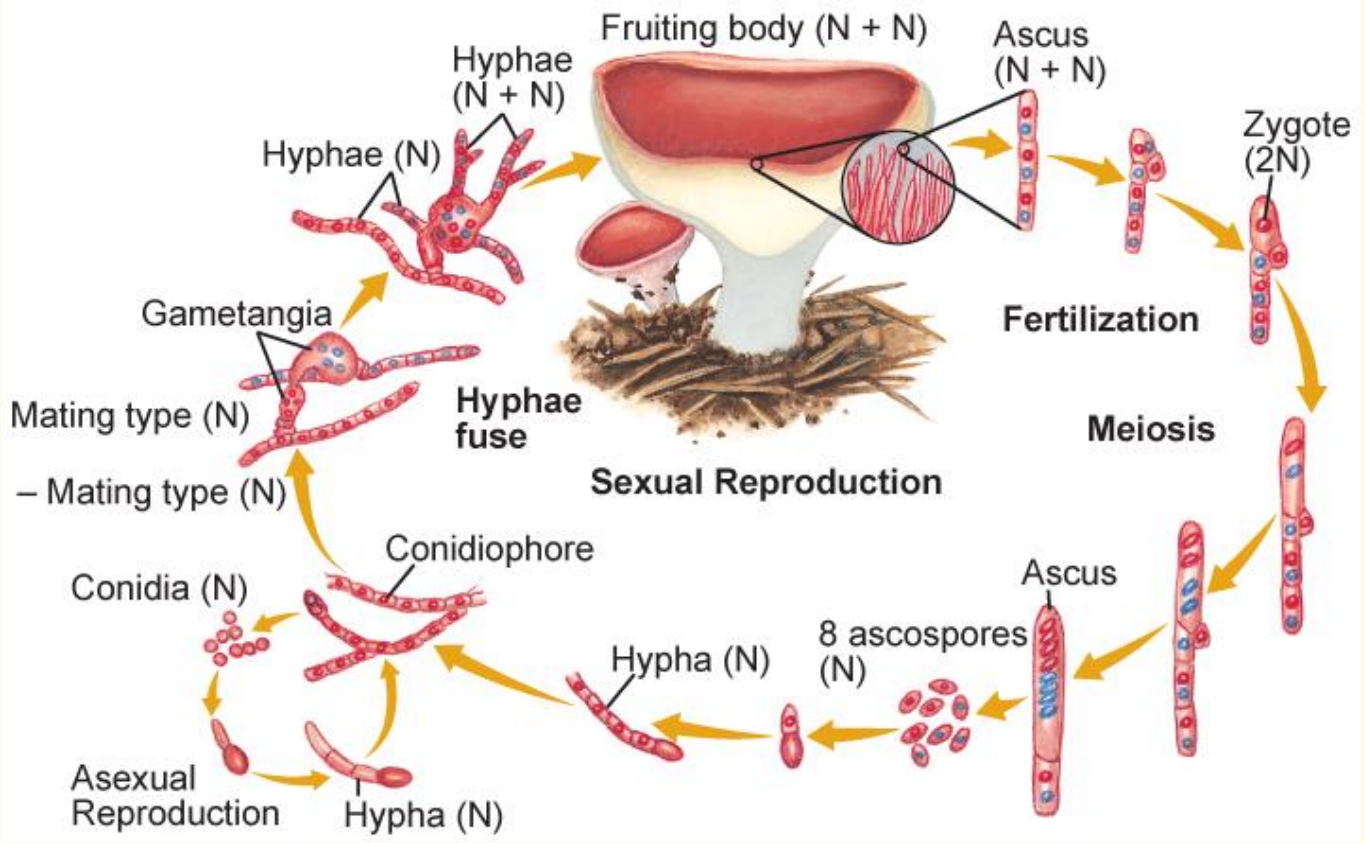
Characteristics of Ascomycota (Sac Fungi)

- Most are multicellular, but some are unicellular.
- Variety of habitats; saprophytic
- Parasitic or mutualistic
- Reproduce sexually and asexually

20.2 Diversity of Fungi

Life Cycle of Ascomycota (Sac Fungi)

- Reproduce sexually and asexually



20.2 Diversity of Fungi

Characteristics of Basidiomycota (Club Fungi)

- Most are unicellular.
- Most are terrestrial.
- Saprophytic, parasitic, or mutualistic
- Rarely produce asexually

20.2 Diversity of Fungi

Characteristics of Deuteromycota (Imperfect Fungi)

- No sexual stage observed.
- Very diverse group
- Might not be considered a true phylum

20.3 Ecology of Fungi

Fungi and Photosynthesizers

- Lichens and mycorrhizae are two examples of mutualistic relationships between fungi and other organisms.
- Mutualism is a type of symbiosis where both organisms benefit from the relationship.

20.3 Ecology of Fungi

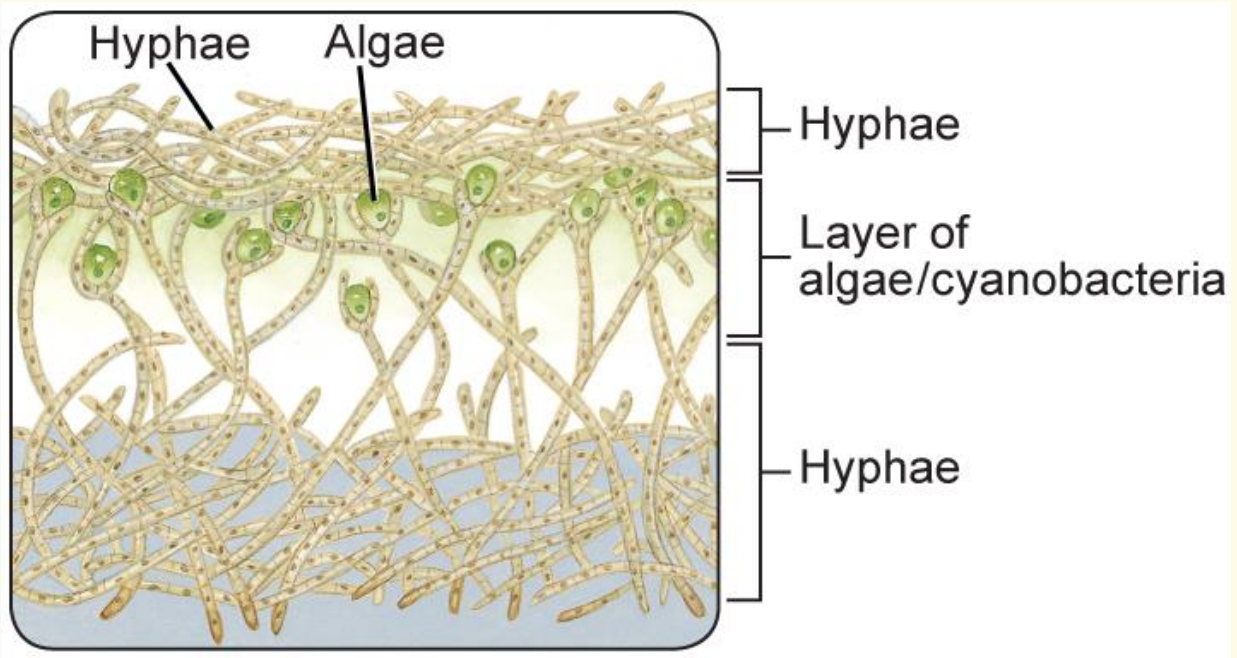
Lichens

- Provide a symbiotic relationship between a fungus and an alga or a photosynthetic partner.
- A green algae or cyanobacterium provides food for both organisms.
- The fungus provides a web of hyphae in which the algae or cyanobacterium can grow.

20.3 Ecology of Fungi

Lichens

- The fungus provides hyphae where the algae or cyanobacterium can grow.



20.3 Ecology of Fungi

Diversity of Lichens

- Over 25,000 species of lichens
- Only need light, air, and minerals to grow
- Found in the harshest environments

20.3 Ecology of Fungi

Diversity of Lichens

- To survive drought, they can dry out, stop photosynthesis, and become brittle.
- Often they are the pioneer species in an area.
- They help trap soil and fix nitrogen, which helps in the colonization of plants.

20.3 Ecology of Fungi

Lichens as Bioindicators

- They are sensitive to airborne pollutants.
- When air pollution rises, lichens will often die.

20.3 Ecology of Fungi

Mycorrhizae

- A mutualistic relationship between a fungus and plant root
- The fungus absorbs and concentrates various minerals for the plant.
- The hyphae increase the plant's root surface area for absorption.
- The fungus receives carbohydrates and amino acids from the plant.

20.3 Ecology of Fungi

Medical Uses of Fungi

- *Penicillium notatum*
  - used as a source of penicillin
- *Claviceps purpurea*
  - used to reduce high blood pressure
  - to control excessive bleeding
  - to treat migraine headaches
  - to promote contractions during birth
- *Tolypocladium inflatum*
  - the source for cyclosporine
  - Cyclosporine is an immune suppressant drug.

20.3 Ecology of Fungi

Fungi and Food

- Mushrooms we eat are fungi.
- Yeast makes bread rise.
- Truffles are fungi.
- The flavors of some cheese are the result of fungi.

20.3 Ecology of Fungi

Fungi and Bioremediation

- Fungi are mixed with water or soil where they decompose organic materials in pollutants.
- The pollutants are broken down into harmless substances.

20.3 Ecology of Fungi

Harmful Fungi

- *Ceratocystis ulmi*
  - kills American elm trees
- *Endothia parasitica*
  - kills American chestnut trees
- *Leptoterochilia medicaginis*
  - causes leaf blotch in alfalfa

20.3 Ecology of Fungi

Harmful Fungi

- Fungi can parasitize humans and other animals.
- *Cordyceps militaris* can infect butterflies and moths.
- Athlete's foot, ringworm, yeast infections, and oral thrush are infections in humans.

Chapter Resource Menu

Click on a hyperlink to view the corresponding lesson.

Chapter Diagnostic Questions

CheckPoint

Approximately, how many species of fungi have been identified?

A. less than 10,000

B. about 50,000

C. over 100,000

D. over 1,000,000

Chapter Diagnostic Questions

CheckPoint

Identify the type of fungus that is considered a decomposer, feeding on dead organisms.

A. saprophytic
B. parasitic
C. mutualistic
D. predatory

Chapter Diagnostic Questions

True or False

All fungi are heterotrophs.

20.1 Formative Questions

CheckPoint

What are unicellular fungi called?

A. chytrids

B. spores

C. yeasts

D. zygomycetes

20.1 Formative Questions

CheckPoint

What are the cell walls of fungi composed of?

A. cellulose

B. chitin

C. glucose

D. peptidoglycan

20.1 Formative Questions

CheckPoint

What are the basic structural units that make up the body of all multicellular fungi?

A. fibers

B. hyphae

C. mycoplasts

D. haustoria

20.1 Formative Questions

CheckPoint

What is the part of a mushroom that grows above the ground called?

A. the ascocarp

B. the sporangium

C. the fruiting body

D. the flowering body

20.1 Formative Questions

CheckPoint

Which type of fungi are decomposers?

A. mutualistic fungi

B. parasitic fungi

C. saprophytic fungi

D. symbiotic fungi

20.2 Formative Questions

CheckPoint

Does evidence suggest plants or animals diverged with fungi from a common protist ancestor?

Answer: Evidence suggests that fungi and animals diverged from a common protist ancestor.

20.2 Formative Questions

CheckPoint

Chytrids were originally grouped with protists. Why have chytrids been reclassified as fungi?

A. Most are aquatic.

B. Some parasitize plants and animals.

C. Their cell walls contain chitin.

D. They produce flagellated spores.

20.2 Formative Questions

CheckPoint

In what phylum are the mushrooms?

A. Ascomycetes (sac fungi)

B. Basidiomycetes (club fungi)

C. Deuteromycetes (imperfect fungi)

D. Zygomycetes (common molds)

20.3 Formative Questions

CheckPoint

What is the name for a mutualistic organism made up of algae and fungi?

A. ascocarp

B. conidiophore

C. lichen

D. mycorrhiza

20.3 Formative Questions

CheckPoint

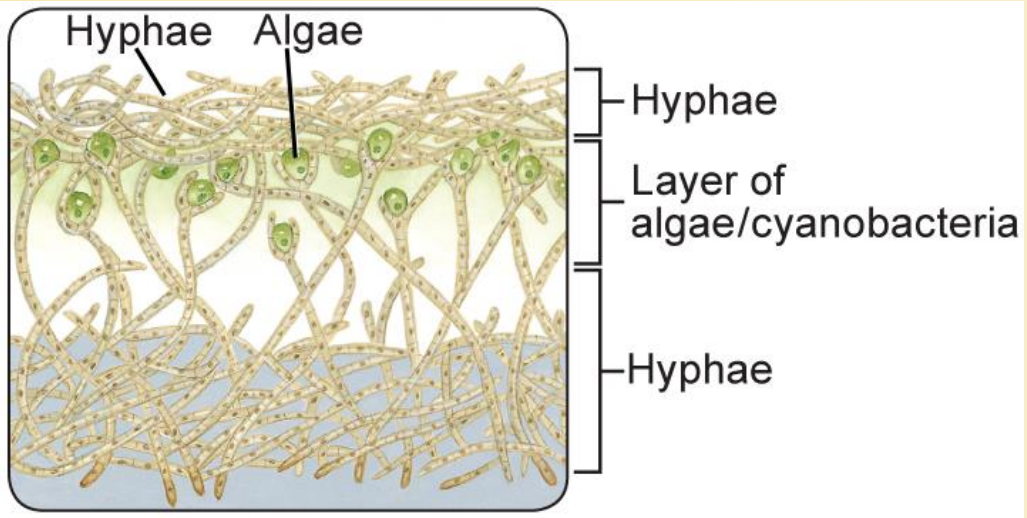
What does the fungus receive from the other partner in this symbiotic relationship?

A. moisture

B. nutrients

C. protection

D. support



20.3 Formative Questions

CheckPoint

What is the term for an organism that is sensitive to changes in the environment and responds to changing conditions?

A. bioindicator

B. biosensor

C. ecoresponder

D. envirometer

20.3 Formative Questions

CheckPoint

A mycorrhiza is a symbiotic relationship between a fungus and _____.

A. a plant root

B. a protist

C. an earthworm

D. human skin

Chapter Assessment Questions

CheckPoint

Which is *not* a form of asexual reproduction?

A. budding

B. fragmentation

C. meiosis

D. spore production

Chapter Assessment Questions

CheckPoint

Name the phyla in which scientists believe the first fungi developed.

A. Chytridiomycota

B. Zygomycota

C. Ascomycota

D. Basidiomycota

Chapter Assessment Questions

CheckPoint

Explain the difference between septate and aseptate hyphae.

Answer: Septa have large pores that allow nutrients, cytoplasm, organelles, and nuclei to flow between cells. Aseptate fungi have no septa and this causes repeated mitosis without cytokinesis. Nutrients flow very quickly through the fungi.

Standardized Test Practice

Why were fungi no longer classified as plants and placed in their own kingdom?

A. Fungi are heterotrophs.

B. Fungi are multicellular.

C. Fungi are more similar to protists.

D. Fungi do not have cell walls.

Standardized Test Practice

CheckPoint

How are fungi different from animals in the way the obtain nutrients?

A. Fungal cells engulf tiny food particles.

B. Fungi digest their food before they ingest it.

C. Fungi feed only on dead organisms and wastes.

D. Fungi use nucleic acids to break down food particles.

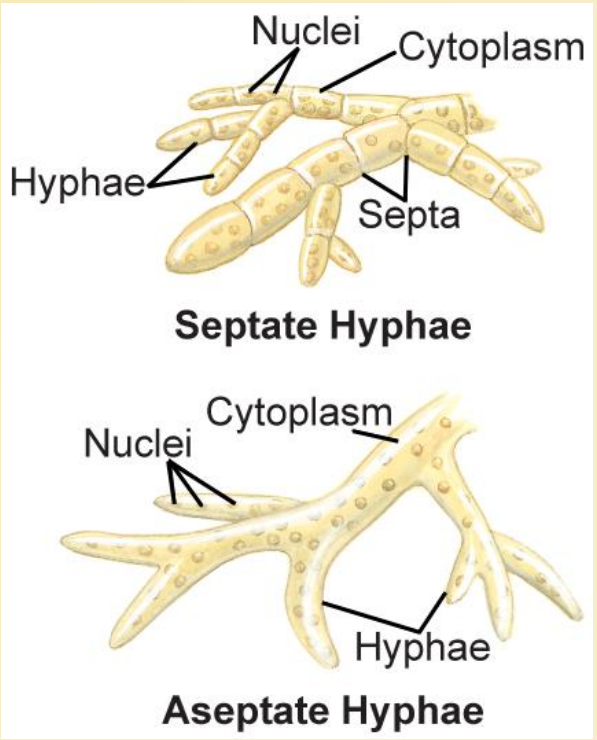
Standardized Test Practice

CheckPoint

Which type of hyphae undergoes repeated mitosis without cytokinesis?

A. septate hyphae

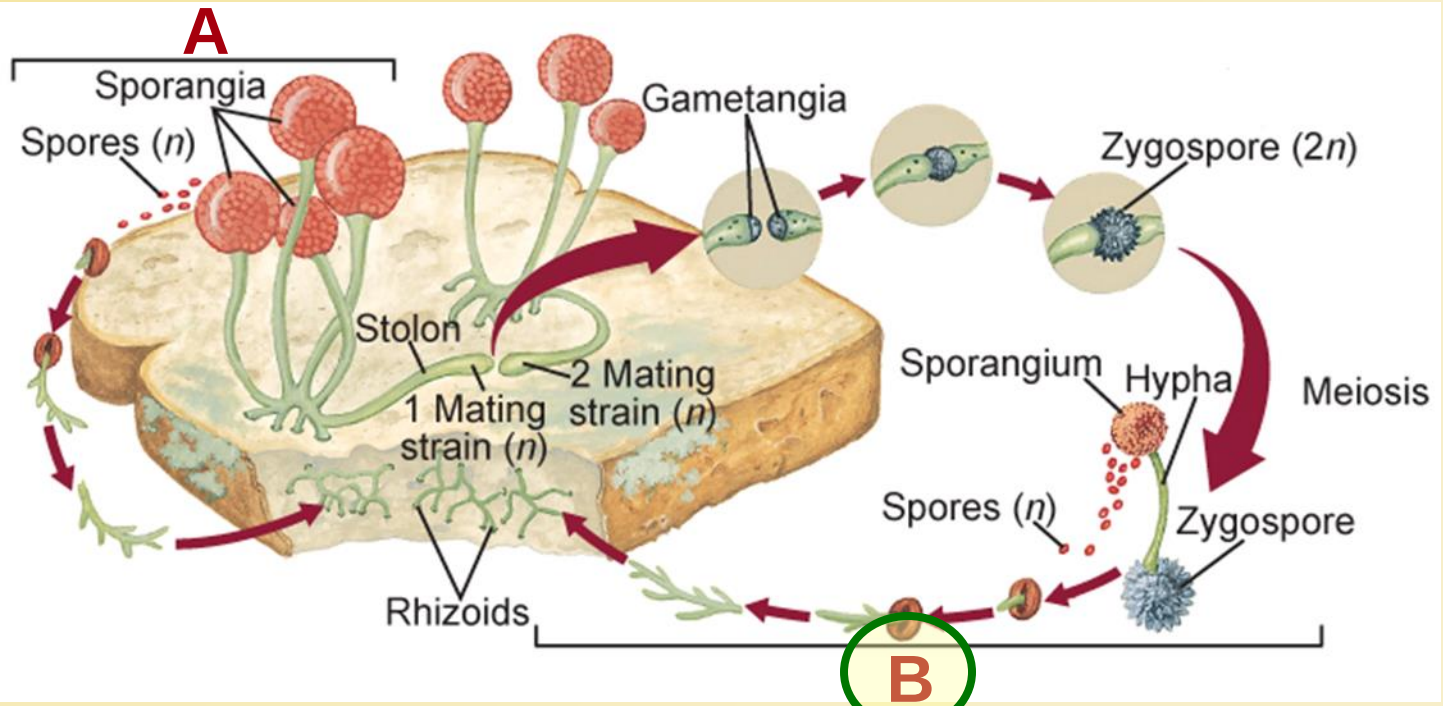
B. aseptate hyphae



Standardized Test Practice

CheckPoint

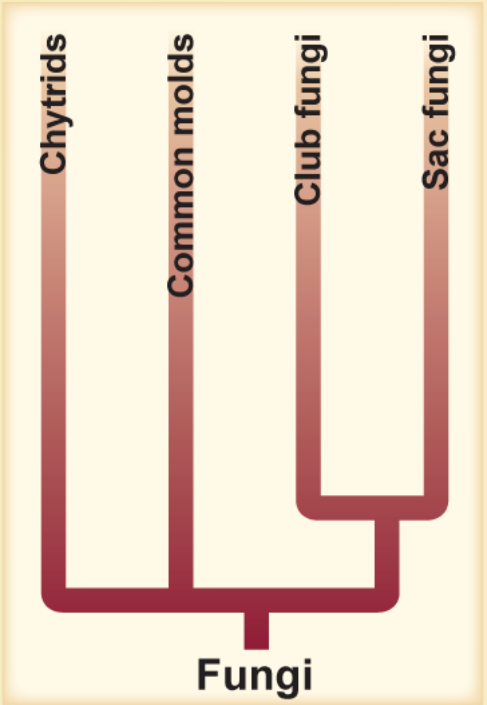
Which stage of reproduction provides greater genetic diversity?



Standardized Test Practice

CheckPoint

Why are the imperfect fungi not included in this phylogenic tree?



A. The group is too diverse.

B. They are not true fungi.

C. They are often classified as sac fungi.

D. They do not have an asexual stage.

Standardized Test Practice

CheckPoint

Why are lichens considered pioneer species?

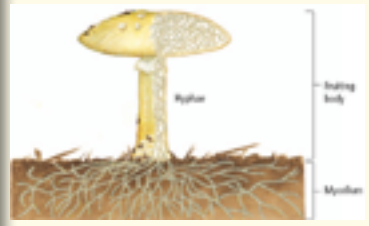
A. They are able to survive severe drought.

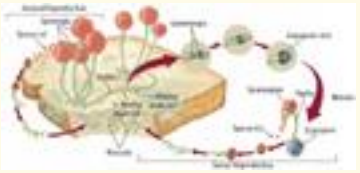
B. They grow in temperate and arctic areas.

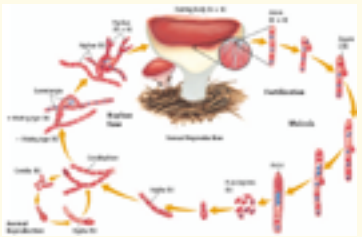
C. They help in the colonization of plants.

D. They produce toxic compounds as a defense mechanism.

Glencoe Biology Transparencies







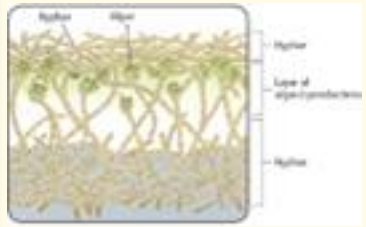
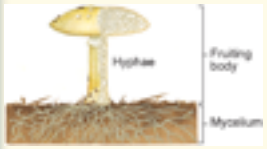
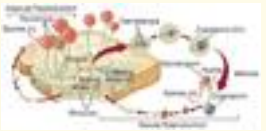
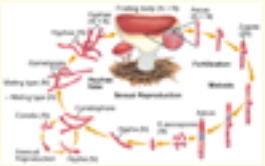


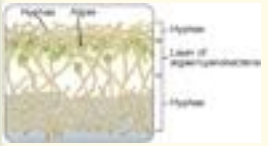
Image Bank


Hyphae
Fruiting body
Mycelium


Nuclei
Cytoplasm
Hyphae
Septa
Septate Hyphae
Nuclei
Cytoplasm
Hyphae
Aseptate Hyphae






Hyphae
Algae
Hyphae
Hyphae

Vocabulary

Section 1

- chitin
- hypha
- mycelium
- fruiting body
- septum
- haustorium
- spore
- sporangium

Vocabulary

Section 2

- stolon
- rhizoid
- gametangium
- conidiophore
- ascocarp
- ascus
- ascospore
- basidiocarp
- basidium
- basidiospore

Vocabulary

Section 3

- lichen
- bioindicator
- mycorrhiza

Animation

Concepts In Motion

- Visualizing a Fairy Ring