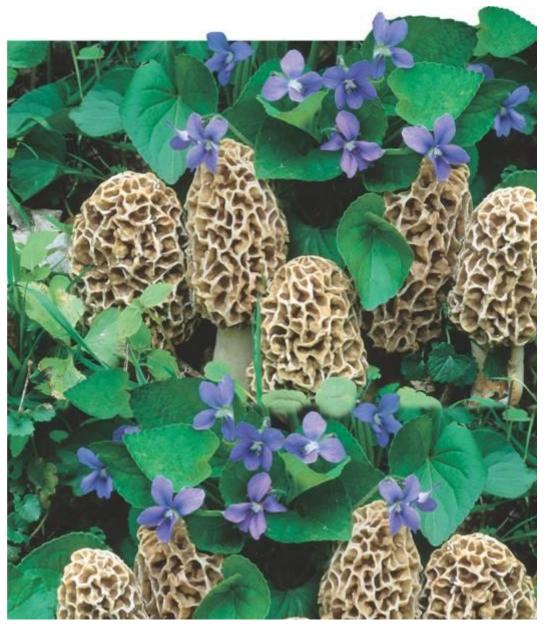
21-2 Classification of Fungi





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Slide 1 of 44 **21-2 Classification of Fungi**

Fungi are classified according to their structure and method of reproduction.

The four main groups of fungi are:

- Common molds (Zygomycota)
- Sac fungi (Ascomycota)
- Club fungi (Basidiomycota)
- Imperfect fungi (Deuteromycota)



Slide 2 of 44 21-2 Classification of Fungi **P** The Common Molds

Zygomycetes have life cycles that include a zygospore.

A **zygospore** is a resting spore that contains zygotes



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Structure and Function of Bread Mold

Black bread mold, *Rhizopus stolonifer*

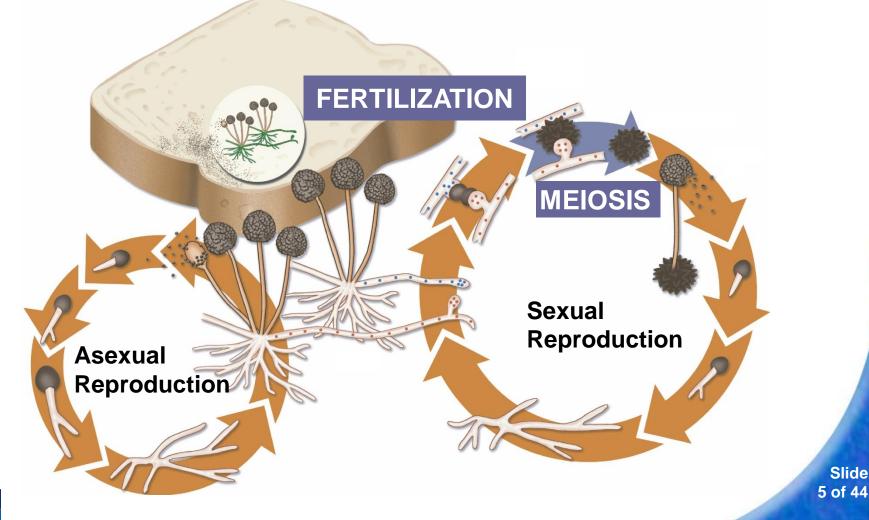
- \rightarrow two types of hyphae:
 - **Rhizoids** are rootlike hyphae that penetrate the bread's surface.
 - **Stolons** are stemlike hyphae that run along the surface of the bread.

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21-2 Classification of Fungi W The Common Molds

Life Cycle of a Black Bread Mold

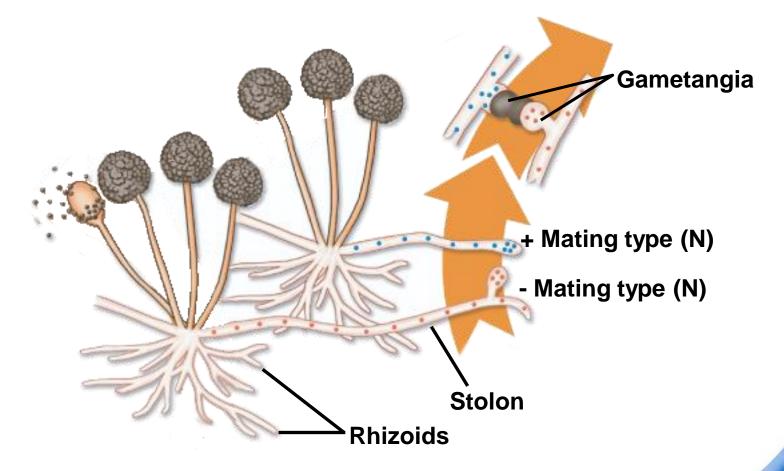


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21-2 Classification of Fungi IDENTIFY The Common Molds

Hyphae from different mating types fuse and produce gamete-forming structures called **gametangia**.



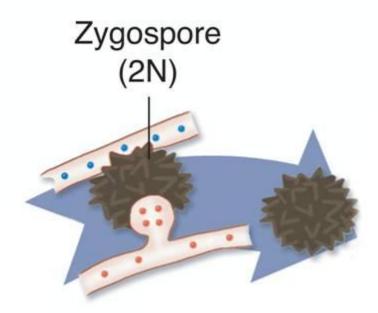


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Slide 6 of 44 21-2 Classification of Fungi 🗪 The Common Molds

Haploid (N) gametes produced in the gametangia fuse with gametes of the opposite mating type to form diploid (2N) zygotes.

Zygotes develop into thick-walled zygospores.



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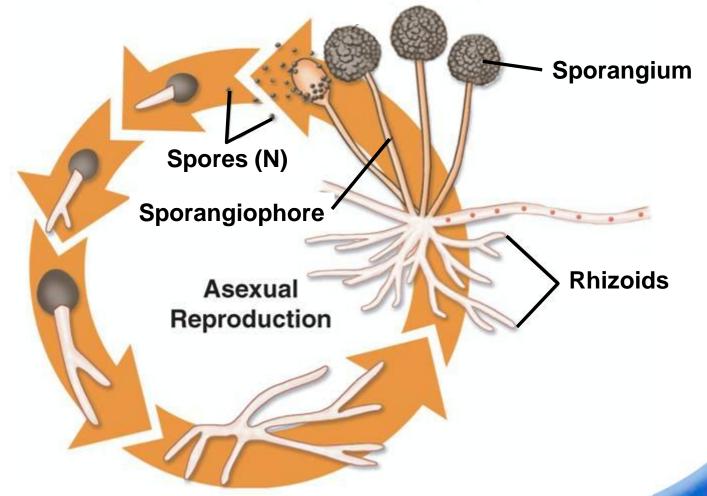
21-2 Classification of Fungi IDENTIFY The Common Molds

In favorable conditions, the zygospore germinates, undergoes meiosis, and releases new haploid spores. Zygospore (2N) **Sporangium** Spores (N) Haploid (N) MEIOSIS Diploid (2N) **Zygospore (2N)** Sexual Reproduction PEARSON

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Slide 8 of 44 **21-2 Classification of Fungi W** The Common Molds

The sporangium reproduces asexually by releasing haploid spores produced by meiosis.



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21-2 Classification of Fungi 🗪 The Sac Fungi

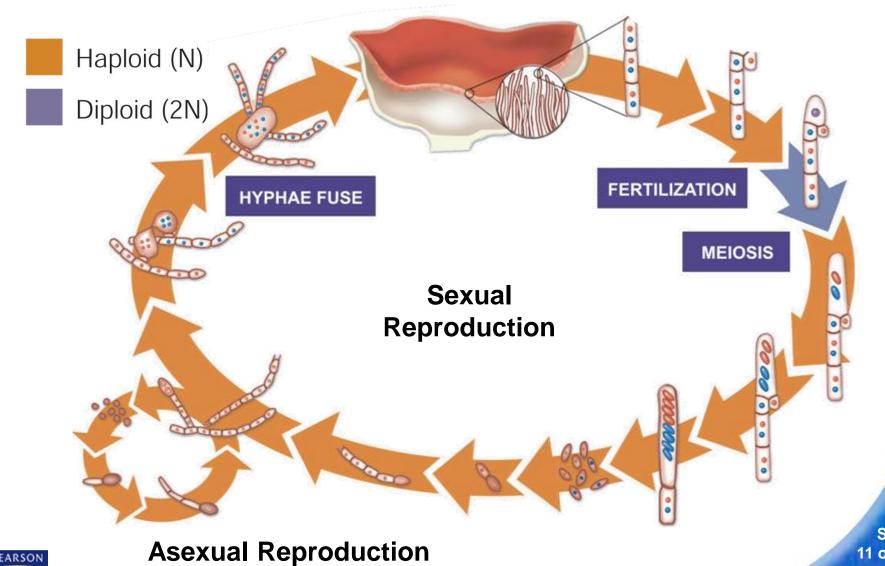
The phylum Ascomycota is named for the ascus, a reproductive structure that contains spores.



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Slide 11 of 44 21-2 Classification of Fungi **P** The Sac Fungi

In asexual reproduction, spores called **conidia** form at tips of conidiophores.

Conidiophores are specialized hyphae.

Conidia (N) Conidiophore Hypha (N)

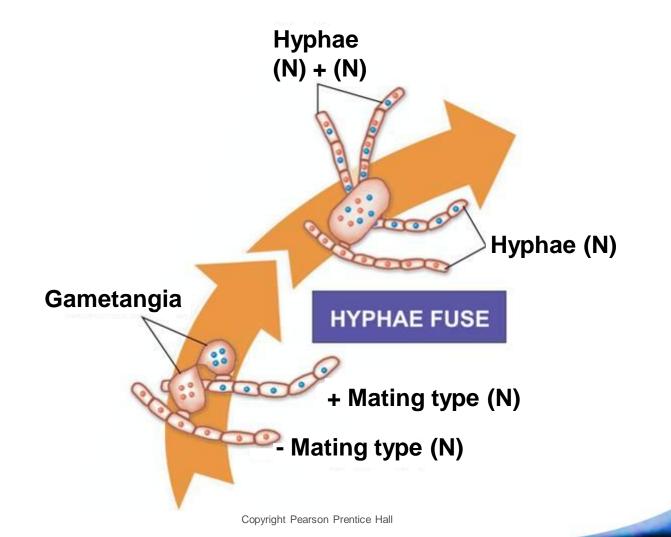


Asexual Reproduction

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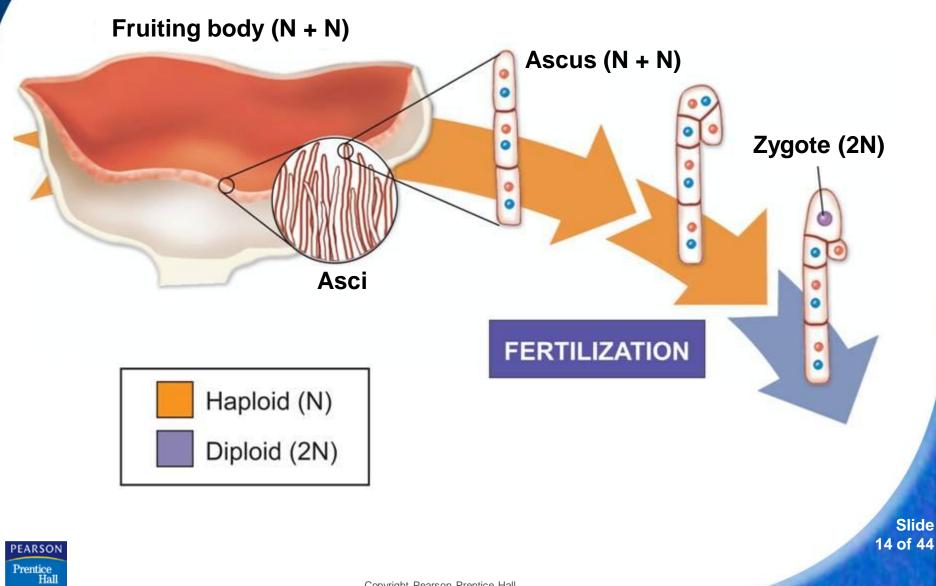
During sexual reproduction, haploid hyphae of two different mating types (+ and -) grow close together.



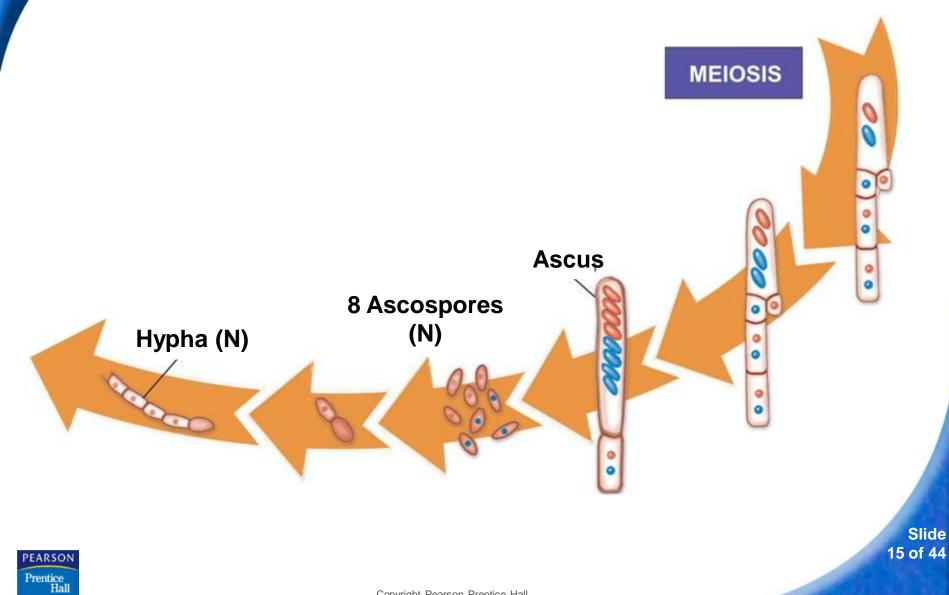
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21-2 Classification of Fungi Image The Sac Fungi



21-2 Classification of Fungi 🗪 The Sac Fungi



21-2 Classification of Fungi **P** The Club Fungi

The phylum Basidiomycota, or club fungi, gets its name from a specialized reproductive structure that resembles a club.

The spore-bearing structure is called the **basidium**.

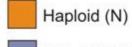
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21-2 Classification of Fungi **W** The Club Fungi

Life Cycle of Club Fungi

HYPHAE FUSE



Diploid (2N)

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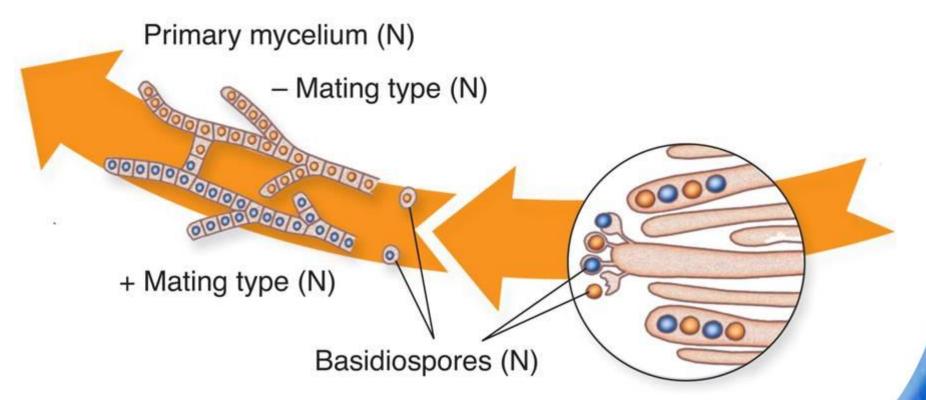


FERTILIZATION

MEIOSIS

21-2 Classification of Fungi > The Club Fungi

A basidiospore germinates to produce a haploid primary mycelium.



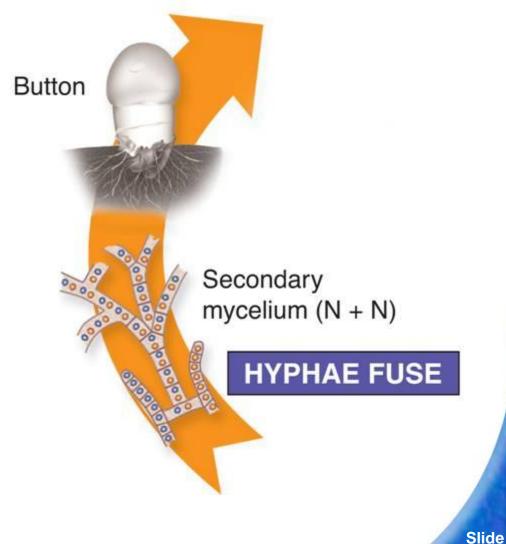


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Slide 18 of 44 21-2 Classification of Fungi **P** The Club Fungi

The mycelia of different mating types fuse to produce a secondary mycelium.

The cells of the secondary mycelium contain haploid nuclei of each mating type.



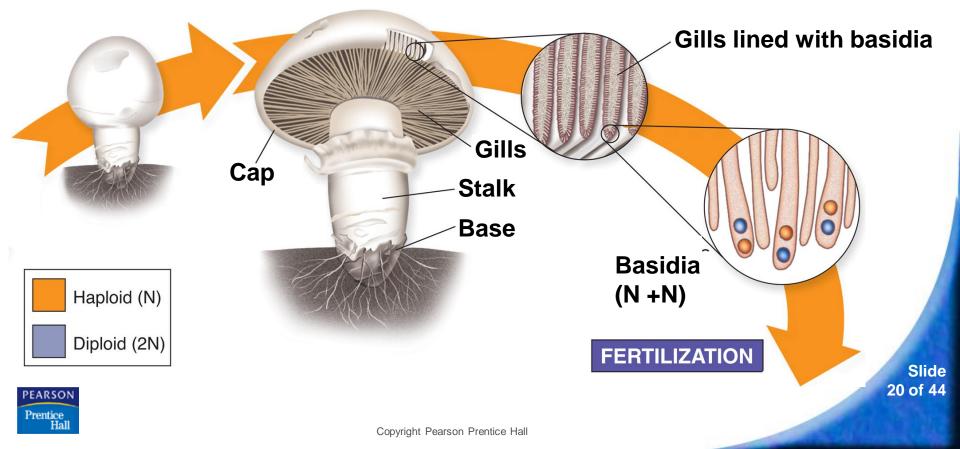
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21-2 Classification of Fungi > The Club Fungi

When the right combination of moisture and nutrients occurs, spore-producing fruiting bodies push above the ground.

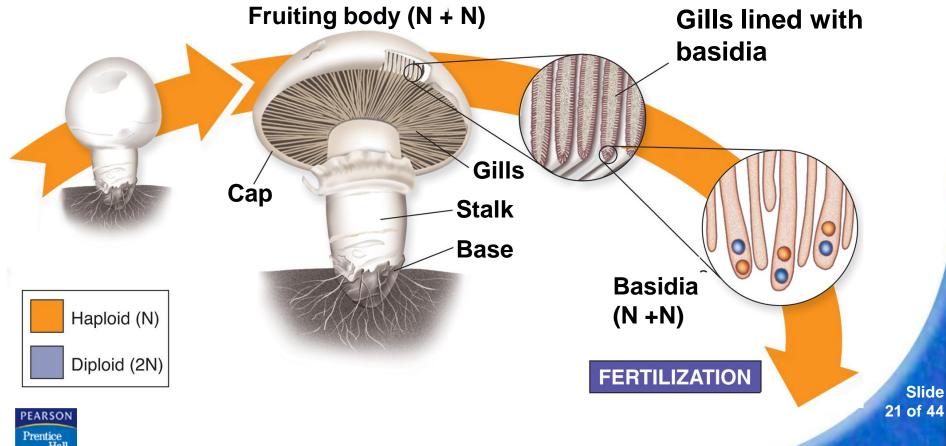
Fruiting body (N + N)



21-2 Classification of Fungi **P** The Club Fungi

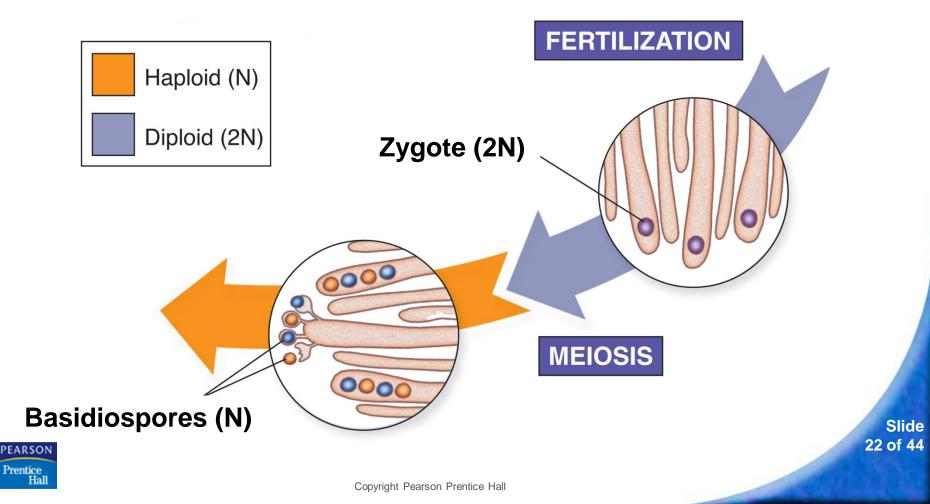
When the mushroom cap opens, it exposes hundreds of tiny gills on its underside.

Each gill is lined with basidia.



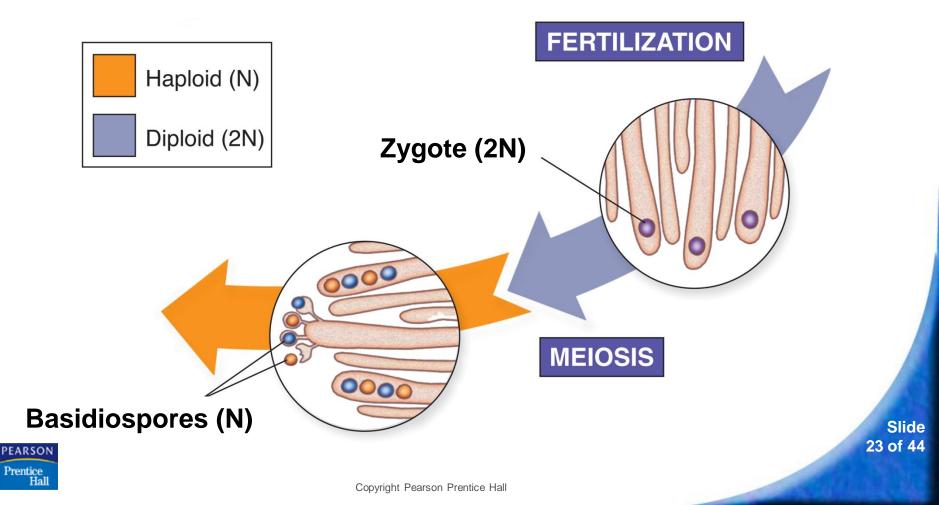
21-2 Classification of Fungi Image The Club Fungi

Nuclei in each basidium fuse, forming a diploid zygote, which undergoes meiosis, forming clusters of haploid **basidiospores**.



21-2 Classification of Fungi Image The Club Fungi

Basidiospores form at the edge of each basidium and are ready to be scattered.



21-2 Classification of Fungi 🛸 The Imperfect Fungi



Imperfect fungi, or Deuteromycota, are fungi that cannot be placed in other phyla because researchers have never been able to observe a sexual phase in their life cycles.



Slide 24 of 44 21-2 Classification of Fungi 🛸 The Imperfect Fungi

A well-known genera of the imperfect fungi is *Penicillium*.

Penicillium notatum is a mold that is the source of the antibiotic penicillin.



Slide 25 of 44 21-2 Classification of Fungi 🛸 21-3 Ecology of Fungi

The oldest known fungi fossils are about 230 million years old.

Fungi may have helped early plants obtain nutrients and may have been essential to plants' colonization of the land.



21-2 Classification of Fungi 🗪 All Fungi Are Heterotrophs

All Fungi Are Heterotrophs

- Many are **saprobes**, which are organisms that obtain food from decaying organic matter.
- Other fungi are parasites, which harm other organisms while living directly on or within them.
- Other fungi are symbionts that live in close and mutually beneficial association with other species.

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21-2 Classification of Fungi Second Secon

Plant Diseases

- Fungal diseases are responsible for the loss of approximately 15% of the crops grown in temperate regions of the world.
- In tropical areas, where high humidity favors fungal growth, the loss of crops is sometimes as high as 50%.

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Some fungi form symbiotic relationships in which both partners benefit.

Two such mutualistic associations, lichens and mycorrhizae, are essential to many ecosystems.



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Lichens

- Lichens are symbiotic associations between a fungus and a photosynthetic organism.
- The photosynthetic organism is either a green alga or a cyanobacterium, or both.



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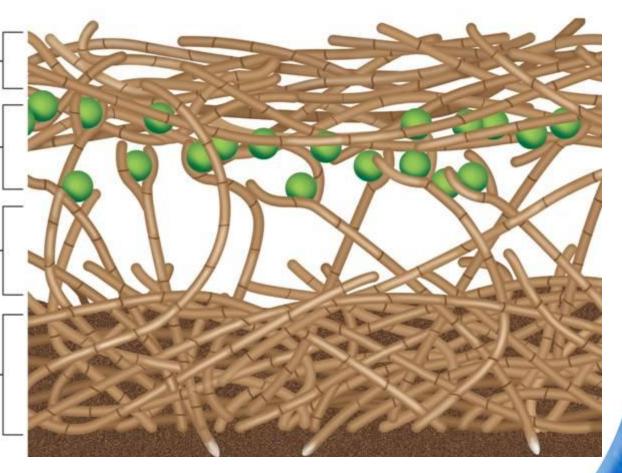
Structure of a Lichen

Densely packed hyphae -

Layer of algae/cyanobacteria —

Loosely packed hyphae -

Densely packed hyphae -





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Mycorrhizae

- Fungi also form mutualistic relationships with plants. The associations of plant roots and fungi are called mycorrhizae.
- Mycorrhizae is essential for the growth of many plants.



Slide 32 of 44 **END OF SECTION**