

## Symbiotic relationships of fungi

Do all fungi feed only on dead organisms?

### Fungi as parasites

In a parasitic relationship, the parasite benefits while the host is harmed. Parasitic fungi live in or on other organisms and get their nutrients from them. Fungi have special structures for penetrating a host. They also produce enzymes that break down the host's tissues.

Parasitic fungi often cause illness and may eventually kill their host. They are the major cause of disease in agricultural plants. Beginning in 1950, Dutch Elm trees in the United States began to die. Since then, most of these trees have been eliminated. The disease was caused by a fungus that acted as a parasite. The fungus that killed the trees was carried by beetles to the trees. Fungi also parasitize animals, such as the insect. Fungi even parasitize humans. Did you ever have athlete's foot? If so, you were the host of a parasitic fungus.



*The white parasitic fungus named *Cordyceps* growing on its host—a dark brown moth.*

## Mutualism in fungi

Fungi have several mutualistic relationships with other organisms. In mutualism, both organisms benefit from the relationship. Two common mutualistic relationships involving fungi are **mycorrhiza** and **lichen**.

- A **mycorrhiza** is a mutualistic relationship between a fungus and a plant. The fungus grows in or on the plant roots. The fungus benefits from the easy access to food made by the plant. The plant benefits because the fungus puts out mycelia that help absorb water and nutrients. Scientists think that a symbiotic relationship such as this may have allowed plants to first colonize the land.
- A **lichen** is an organism that results from a mutualistic relationship between a fungus and a photosynthetic organism. The other organism is usually a **cyanobacterium** or **green alga**. The fungus grows around the bacterial or algal cells. The fungus benefits from the constant supply of food produced by the photosynthesizer. The photosynthesizer benefits from the water and nutrients absorbed by the fungus.



*Lichen growing on rock. Unlike plants, lichen can grow on bare rocks because they don't have roots. That's why lichens are often pioneer species in primary ecological succession.*

Some fungi have mutualistic relationships **with insects**. For example:

- **Leafcutter ants** grow fungi on beds of leaves in their nests. The fungi get a protected place to live. The ants feed the fungi to their larvae.
- **Ambrosia beetles** bore holes in tree bark and “plant” fungal spores in the holes. The holes in the bark give the fungi an ideal place to grow. The beetles harvest fungi from their “garden.”