

## The Remarkable World Of Fungi Part 1

Fungi are a group of living organisms which are classified in their own kingdom (family) forming part of the eukaryotic group of organisms. The kingdom includes mushrooms and toadstools (poisonous mushrooms), rusts, yeasts, moulds and mildews. They are of enormous environmental and medical importance.



Fungi can be found in almost any habitat except in the arctic – in sea water, freshwater and soil, on plants and animals and on human skin

They vary widely in size from microscopically small to the largest organisms on earth at several square miles large. There are more than 100,000 different identified species of fungi – scientists believe that there are at least a million more unidentified fungi waiting to be discovered.

Fungi were once classified as plants as they were perceived not to move, however, they differ in a number of important ways:

- Fungi cell walls are composed of chitin rather than cellulose as in plants
- Fungi do not make their own food like plants do through photosynthesis
- They get their food from decomposing matter or forming a symbiotic relationship with plants or eating off their hosts as parasites
- They do not possess chlorophyll like plants
- They reproduce through numerous spores rather than pollen, fruit, or seeds

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Fungi can be categorised into three different groups depending upon how they feed.

**Symbiotic or Mycorrhizal fungi** live in association with plants' root systems where a beneficial exchange takes place between the two. The underground part of the fungi organism is made up of thousands of interweaving threads called hyphae which penetrate the roots of trees. The fungi have almost constant access to the trees' carbohydrate stores. In return, fungi aid the trees' capacity to absorb water and minerals through the fungal structure of highly absorbent mycelium, (vegetative mats formed by the interweaving mesh of hyphae) effectively expanding the root system of the host plant

One of the most notable relationships the Fly Agaric (*Amanita muscaria*) with the Silver Birch (*Betula pendula*)



The mycelium of Fly Agaric often forms a symbiotic relationship with the trees around it, wrapping around the roots and supplying them with nutrients taken from the soil. In exchange, the fungus receives sugars produced by the trees.

**Saprophytic fungi** are the largest group in the fungus kingdom and are responsible for breaking down and recycling dead plant and animal material. These are the fruit-bodies you see on dead trees, leaf litter, animal bones, even faeces.

Saprophytic fungi release enzymes to break down and digest the lignin, cellulose or chitin in this material into simple soluble compounds that can be absorbed by them, and by plants, as nutrients. In so doing, they play a vital role in reducing the accumulation of dead organic material and in recycling essential nutrients, particularly carbon and nitrogen.

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Bracket fungus on a dead tree trunk

Without the activity of saprophytic fungi, woodlands would be eye-brow deep in undecomposed leaves and debris.

**Parasitic fungi** live off or at the expense of their live host plant, often resulting in the demise of this host. In general these fungi will only target already unhealthy or stressed plants

Parasitic fungi almost wiped out the UK population of elm trees due to Dutch elm disease in the 1970's. This was thanks to the microscopic *Ophiostoma novo-ulmi* fungus. Elm bark beetles breed in the bark of cut, diseased or otherwise weakened elm trees then disperse to healthy elm trees where they feed. As they feed, the spores of *O. novo-ulmi* are introduced into the xylem (channels for water and nutrients) of the healthy tree, releasing toxins and causing the vessels to block and the tree to wilt and die.



Larvae of the Elm Bark Beetle



Wilting leaves of a diseased elm tree