

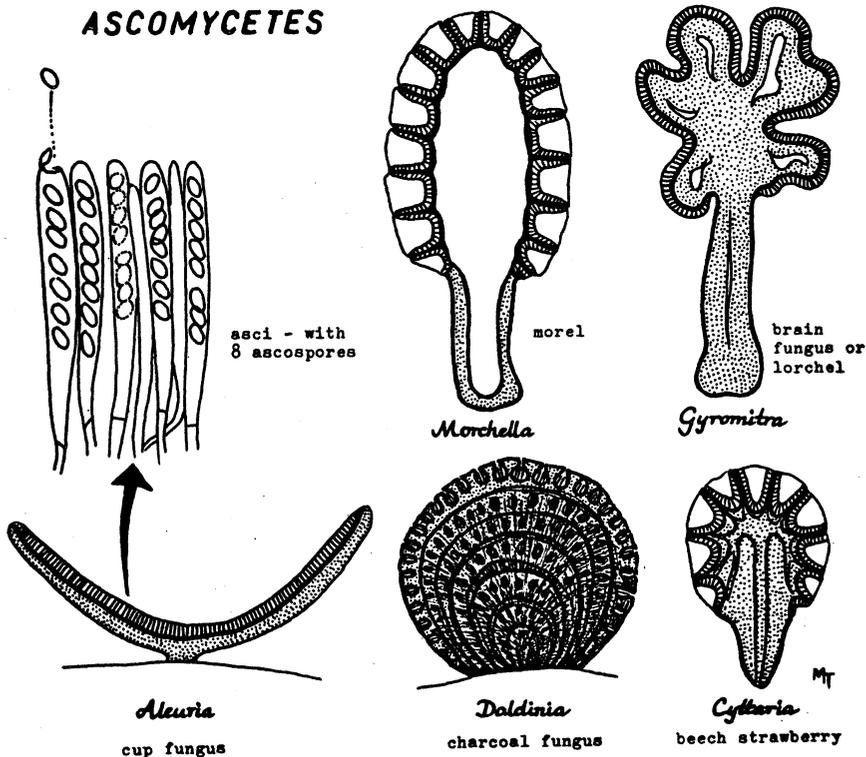
THE BIOLOGY OF FUNGI

By: Marie Taylor

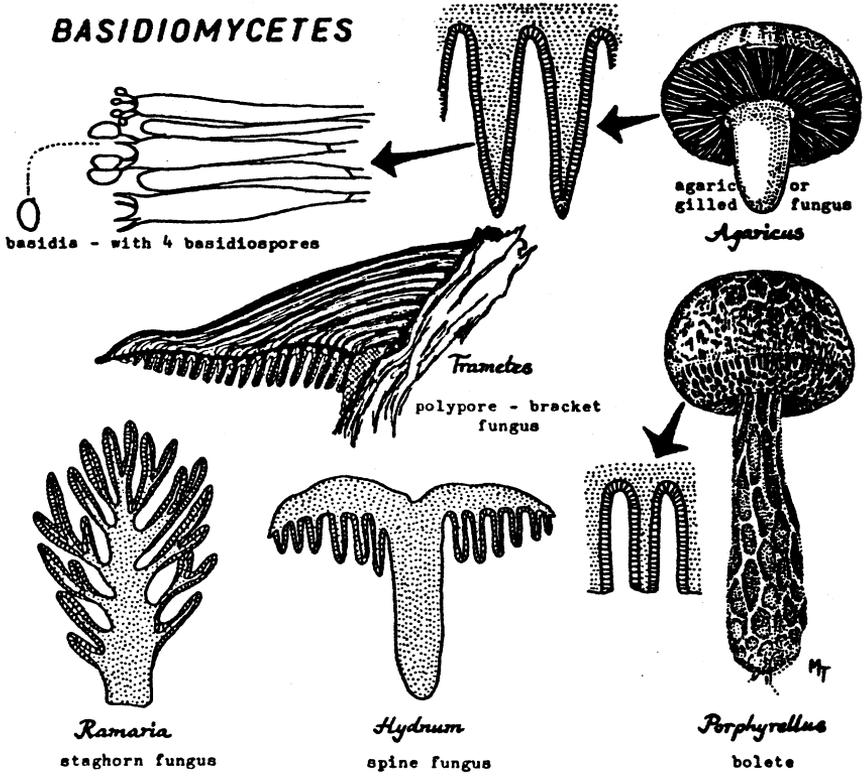
The fungi have been traditionally regarded as a group of plants, distinguished from the rest by their lack of chlorophyll. Because they do not feed after the manner of the green plants, we are not usually so familiar with their way of life. All fungi must feed on biological matter of one kind or another.

By far the larger number are scavengers or saprophytes, specialising in garbage disposal. Some have a wide range of taste, others have become specialists in particular media, with their chemical capabilities closely matched to the substances they deal with. Wood, flesh, paper, feathers, horn, sewage, plastic - you name it, some fungus probably eats it. Fungus hunters in the tropics have the tables turned on them by fungi that live on the lenses of microscopes and binoculars, etching the glass.

ASCOMYCETES



A much smaller group are robbers of the living, and often murderers. These parasites, like the sensational fringe in human societies, are the ones who get all the publicity. The victims are as varied as life itself, ranging from microscopic eelworms and soil protozoans, through insects, plants and mammals to man himself; and some fungi even make meals of other fungi.



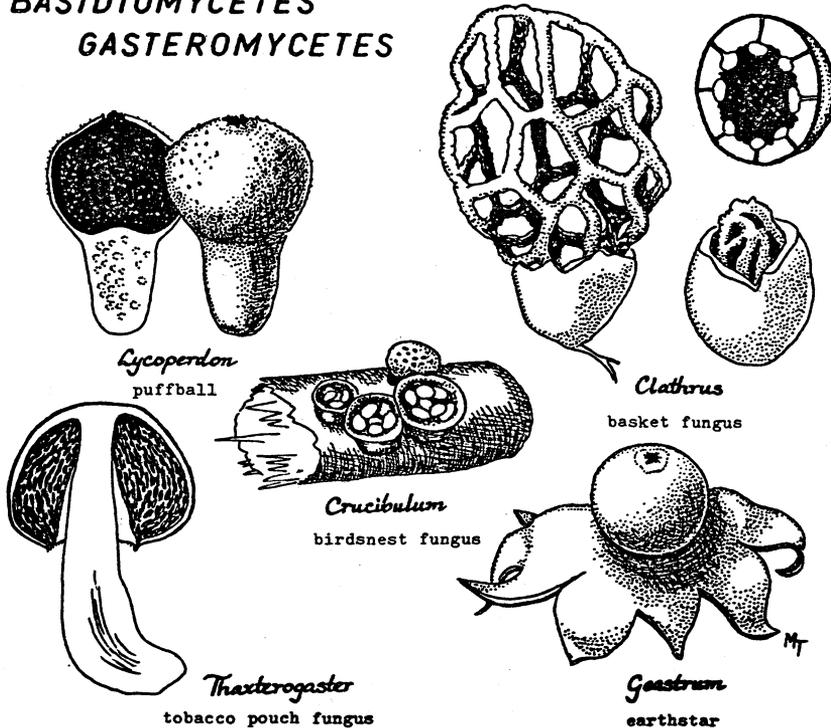
The body of a fungus is an elusive structure not often seen in the wild state. It is developed when a fungus spore lands on a suitable place where moisture, temperature and food are favourable for germination. The spore puts out a single microscopic thread which grows and branches, grows and branches; pushing and probing its way through whatever lies in its path until it becomes a felted mass of mycelium woven inextricably with its substratum. The true fungus plant is this hidden web, making its living by sending out foraging enzymes into the surroundings, and soaking in the food they garner on its behalf. The presence of a fungus mycelium may not be obvious in its early stages of growth, but later there will be chemical alterations of the medium manifesting themselves as changes in colour, texture or taste. The body form of a fungus may seem rather indefinite, but it is ideally

suites to its infiltrating method of growth, and the fine threads make for an immense surface of contact with the food.

Sooner or later the well-fed fungus will be ready to complete its life cycle by producing spores. The simpler microfungi mostly produce spores from the ends of erect hyphal threads. This is the method of the moulds, mildews and blights. The more primitive examples don't even have windborne aerial spores but produce swimming spores; evidence for the theory that fungi, like other organisms, began their evolution in the water before they conquered the land.

The more complex macrofungi or "higher" fungi retain the microscopic hyphae as their vegetative growth, with the addition in some species of woven ropelike strands for covering more ground, but their most obvious feature is the weaving of the hyphae into massive, visible fruiting bodies to produce, protect and disperse the spores. Biological success is measured by successful reproduction, and extinction is the price of failure. The fungi have produced a variety of elaborate fruitbodies to ensure the success of the new generation. It is the fruitbody that we think and talk of as the fungus, but we should always remember that they are shortlived and correspond only to the apple fruit in the life of an apple tree.

BASIDIOMYCETES GASTEROMYCETES



Spores are the equivalent of seeds. However a seed contains a miniature plant, the embryo, complete with a tiny root, shoot and first leaves. A spore is but a single cell much tinier and less robust than a seed, and produced in far greater numbers to offset wastage. There are millions of them floating in the air around us.

From this point onwards I will use the general term fungus to mean the macrofungi.

Fungi are classified according to the way in which their spores are produced from the hyphae, details which cannot be seen just by looking at the fruitbody, but which require microscopic examination.

The two main kinds of fertile organ are the ascus and the basidium which give rise to the names ASCOMYCETES and BASIDIOMYCETES for the groups of fungi that possess them. In both cases the ascus or basidium is formed as the result of a sexual process in the hyphae, with fusion of nuclei followed soon afterwards by meiosis or reduction division to restore the normal number of chromosomes, and the resulting daughter nuclei form the spores around themselves.

An ascus is the club-shaped tip of a hyphal thread containing spores formed internally, and squirting them out through the apex when ripe, like seeds from a squirting cucumber. Moisture is needed for spores to be exploded from the ascus. The cup fungus is an example of an ascomycete fruitbody, shaped like a cup and lined with a tightly packed palisade of asci and cushioning hairs which together make up the fertile surface.

In the basidium, the spore nuclei are produced inside a fertile hypha, but they migrate out from the tip of the mother hypha by way of outgrowing horns, so that the spores come to maturity held aloft from the fertile surface on fragile stalks. Basidiospores, like ascospores, are also shot off actively when ripe, the discharge process again requiring moisture for its performance. Once in the air, both kinds of spores are carried away by wind currents.

HYMENOPHYLLUM - Upon the whole the New Zealand species are the finest in the Genus.

Hymenophyllum dilatatum - A magnificent fern - the noblest in the Genus.

The Botany of the Antarctic Voyage of H.M. Discovery ships Erebus and Terror. 1839-43. J.D. Hooker.
