



www.fungibank.csiro.au

SECTION 1: "HOME"

Using the services of Australia's fungi to restore landscapes

FungiBank improves the availability of information about Australia's rich resource bank of native fungi. It provides information on the benefits of **incorporating native fungi into revegetation** and advice on sourcing and propagating native fungi. We hope FungiBank will encourage and enable people to find and recognize fungi and to use the fungi efficiently and responsibly in **management and restoration of landscapes**.

A prominent focus of FungiBank is fungi of **Australia's remnant temperate woodlands** as revegetation and restoration in these regions is an urgent national issue. FungiBank also supports work in other woody ecosystems in other parts of Australia including **eucalypt forests, urban bushlands and rehabilitating mine sites**.



Why bother with fungi anyway?

There are many reasons - here are a few:

- **Urgency:** Natural reservoirs of native fungi are rapidly depleting. What will be our source of native fungi in the future?
- **Essential Heritage:** Fungi are a major part of Australia's heritage due to their richness, uniqueness, crucial roles in decomposition and recycling of soil nutrients, and beneficial partnerships with native plants and animals.
- **Self-sustaining revegetation:** Just as we put back native plants, we also need to put back the original fungi.
- **Environmental accreditation:** Likely to increasingly determine marketability of Australian farm and forest products. There will be demand for revegetation with high native biodiversity in commercial lands.





Natural Heritage Trust
Helping Communities Helping Australia
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SECTION 2: "WHAT ARE FUNGI?"

The word "fungi" (plural) and "fungus" (singular)

The word "Fungi" can be best pronounced as "funj-eye" or "fun-gee" (with the 'g' as in gold, not as in gentle). Both ways are acceptable - the first way is mostly favoured by British English and the latter by American English.

Most people think of gourmet truffles, magic mushrooms, itches between the toes, mouldy bread, mildew on the bathroom tiles, rotting wood, or poisonous toadstools to be kicked over or avoided at all costs. Less often realised is that fungi are essential to billion \$ industries such as bread, brewing, medicines, and toxic waste removal. Rarely considered, even in general scientific circles, is that there are many times more fungi than plants in the world, and that each type of fungus contributes crucial roles to processes underlying the sustenance of forests, woodlands and other landscapes world-wide.

What are fungi?

Fungi have their own Kingdom separate from plants and animals. Unlike plants, fungi lack chlorophyll and therefore do not manufacture their own energy. The basic structures of fungi are microscopic cobweb-like threads called hyphae which comprise the feeding and growing body of the fungus - mycelium. The majority of the world's fungi are microscopic and mostly they do not produce structures visible to the naked eye except if the hyphae form a thick growth. These fungi are commonly referred to as 'moulds'.



Mycelium amongst soil and rocks



However perhaps the most familiar fungi are those which produce spore-bearing fruit bodies clearly visible to the naked eye. They are the so-called 'larger fungi' or 'macrofungi'. Their large structures such as mushrooms, toadstools, puffballs, coral fungi, earthstars, truffles are

the spore-bearing fruit bodies of these fungi. The large types of fungi are the focus for FungiBank.



Agaricus mushroom



Gymnopilus on side of tree

Fungal fruit bodies are in one way analogous to the flowers and fruits on plants, but the leaves and branches of most plants remain conspicuous after flowering/fruitletting has been completed whereas most fungi cannot easily be found before and after fruitletting. Usually the only obvious part of fungal life cycles is when they fruit. No wonder the functions of fungi crucial to healthy ecosystems are often not recognized - as the fungi function underground, out of sight.

For a diagram of fungal parts see [Royal Botanic Gardens, Melbourne](#).

How fungi propagate

Fungi propagate by two main ways:

1. Vegetative propagation: fungal networks of threads (mycelium) spread outwards in soil into new territory, perhaps forming partnerships with new plants, or colonising new patches of organic matter.



2. Spores: Mushroom types of fungi produce massive amounts of spores on their gills. The spores are forcibly shot out into the air and are spread by the wind. Truffle fungi have below-ground fruit bodies and rely upon animals such as woylies to sniff them, dig them up, and eat them. The truffle spores pass unharmed through the animal's gut, and are deposited in the dung.



Mushroom spore prints



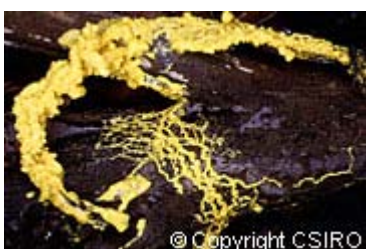
Spores - highly magnified



Spores are the most useful way to include fungi in revegetation efforts (see the section on "[Restoring native fungi back into revegetation](#)" for the details).

Slime moulds and lichens strictly are not fungi

Slime moulds generally are not considered to be part of the Kingdom Fungi but more aligned with Protozoa, partly because they have an amoeboid phase. Lichens are associations between fungi and algae or cyanobacteria. Usually the partners comprising a lichen are unable to live apart. Leaf-like forms of lichens may be mistaken for larger fungi. Lichens and slime moulds are not considered further in FungiBank.



A slime mould



Lichen on tree bark

Differences between a mushroom and a toadstool

The terms 'mushroom' and 'toadstool' are subjective rather than strictly scientific, and therefore are open to a range of loose interpretations. In general, fungi with fruit bodies that have a cap more or less centrally placed on top of a stem are referred to as 'mushrooms', or as 'mushrooms and toadstools'. Some people broadly consider that all fungi with a cap and stem are 'mushrooms', while others consider only edible fungi as 'mushrooms'. In the strictest sense, the word '**mushroom**' refers only to members of the genus *Agaricus*, e.g. the cultivated white button mushroom. '**Toadstool**' is typically applied to any fungus with a cap and stem that appears different from *Agaricus*, regardless of its edibility, or more usually if it is suspected or known to be poisonous. In a broader sense, 'toadstools' also includes other non-mushroom forms of fungi such as



puffballs, earthstars, and coral fungi.



Agaricus Mushroom



Galerina Toadstool

Learn more about fungi

There are many books and web sites about fungi in general such as University of Sydney, "[Introduction to the biology of fungi](#)".

"Introduction to Fungi" at

<http://www.ucmp.berkeley.edu/fungi/fungi.html>

"Fun facts about fungi" at

www.herb.lsa.umich.edu/kidpage/factindx.htm

"Mykoweb" at <http://www.mykoweb.com/>

"Mycokey" - a good online guide to fungal genera, at

<http://www.mycokey.com/uk.html>

"Tom Volk's Fungi" at http://botit.botany.wisc.edu/toms_fungi/

"The WWW Virtual Library: Mycology" at

biodiversity.uno.edu/~fungi/

and an excellent lively outline of the Kingdom Fungi by B.

Kendrick, (2001). "The Fifth Kingdom" (3rd. ed.)

Mycologue Publications, Sidney, British Columbia,

Canada.

The above is only a few references - more can be seen in the [Additional Resources](#) section.

See also the section on [Identifying Fungi](#)

This is the End of this Section: "What are Fungi"

Next Section: "Value to Landscapes"



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