

Skills for Nature Conservation

Fungi

What are fungi?

Fungi have their own Kingdom separate from plants and animals. They lack chlorophyll and cannot produce their own energy, so they are either saprophytes, parasites or form symbiotic relationships. The diversity within the Fungal Kingdom far exceeds that of the Plant Kingdom. It is estimated in Australia that there are more than 250,000 species of fungi however only 5-10% of these have been described and named. Most fungi are microscopic but some produce fruiting bodies visible to the naked eye. These are known as "larger fungi". The body of a fungus is made up of a massive network of fungal threads (mycelium) that spread throughout the material they are feeding on (eg. soil, dead wood). At certain times of the year, they develop fruiting bodies, with the larger fungi producing them in many distinctive forms and colours.

What roles do fungi fulfil in our ecosystems?

Fungi benefit ecosystems via their vast networks of mycelium. They play many important and varied roles in the function of our ecosystems including:

- Decomposing leaf litter and woody debris to provide nutrients for plants and to return organic matter to the soil;
- Aiding uptake of soil nutrients by most plants through symbiotic relationships;
- Providing food for native animals;
- Transporting nutrients (such as phosphorus and nitrogen) and carbon through the soil;
- Improving soil structure by physically holding the soil together with their mycelium.

Taxonomic classification of fungi

There are two main groups of larger fungi that differ in the way they produce spores. The **Basidiomycetes** reproduce by basidiospores that are formed on **basidia**. The basidia cover the gills of mushrooms, line the pores of brackets, cover the clubs of coral fungi, or are contained within puffballs and truffle-like fungi. The **Ascomycetes** reproduce by ascospores, which are produced within sac-like **asci**. Many are microscopic, but those with large fruit bodies include morels, earth-tongues, cup fungi and true truffles.

Basidiomycetes	Ascomycetes
<p>Agarics: Mushrooms with gills Boletes: Mushrooms with pores Coral fungi: Fruit bodies with simple club-like or multi-branched structures Puffballs: Sac-like fungi Spine fungi: Mushrooms or fruit bodies with spores produced on spines or teeth Resupinate fungi: Flat, crust-like, skin-like, or paint-like fungi, usually on wood. Polypores and bracket fungi: Firm or hard bracket-like fungi on wood Jelly fungi: Soft, gelatinous or rubbery fungi on wood Truffle-like fungi: Underground fruiting fungi</p>	<p>Cup fungi: Fleshy disc- or cup-shaped fungi Earth tongues: Firm, tongue-shaped fungi Morels: Fleshy fungi with a distinct elongated honeycomb-like cap Flask fungi: Tough, charcoal-like fruit bodies True truffles: underground fruiting fungi.</p>

Ecological classification of fungi

In ecological terms there are three main types of fungi:

1. **Saprophytic fungi**, which obtain their nutrients and energy from breaking down dead organic matter in soil, leaf litter, dung and woody debris.
2. **Pathogenic fungi**, which derive their energy from other living organisms such as plants and insects.
3. **Symbiotic fungi**, which form mutually beneficial partnerships with other organisms.

Why is it important to keep fungi in bushland?

Fungi are important for ecosystem function and can improve ecosystem health. They help the growth and establishment of revegetation through their roles in nutrient cycling and transport. They provide an important food source to some native animals.

Fungi are sensitive to disturbances such as removal of woody material, and loss of native plants and animals.

Many fungi do not self-return to revegetation sites and need to be nurtured back to help develop self-sustaining vegetation for the future. Fungi remaining in dwindling natural bushlands are the only source for revegetation and restoration.

It is important for **you** to find out the fungi in your patch so that you know which species/groups are in your area, make contributions to scientific knowledge, and to appreciate the beauty and diversity of fungi. Many of our local fungi are unique to Australia and are not yet named, so there are many exciting discoveries to be made.

Collecting fungi

Fruit bodies are the most visible signs that fungi are present but by gently scraping back leaf litter you may be able to see fungal threads. You can find fungi on living trees, fallen branches, among leaf litter, and below the soil surface.

It is important to consider the sort of information you want to know about fungi. Do you want to know which species or groups are present in your patch or do you want to collect them for a permanent record?

If you just want to know what is there then you don't need to collect fungi. You can just photograph them and leave them there, causing little disturbance to the fungi and soil. If you are collecting specimens then you need to ensure:

- Soil disturbance is kept to a minimum.
- You don't collect more than you need.
- Make sure that you have a current licence or permit (contact the DCLM on 9334 0333).

Useful information to record includes:

- A unique reference number.
- The date, location and collector's name.
- Associated plants and soils.
- Habit of the fungus – e.g. on dead wood or living tree, in litter, underground.
- Shape, size, texture and colour of the young through to mature specimens.

All information must be recorded when the specimen is fresh as the characteristics may change as it dries out. A colour photograph is also helpful. It is good practice to collect a spore print and then dry the specimen overnight in a food dehydrator on a low temperature setting. Specimens should be stored in a dry, clean environment in a zip-lock or paper bag or envelope labelled with its reference number. If you are collecting specimens to contribute to scientific knowledge talk to the WA Herbarium about vouchers. You can also contact the Fungal Studies Group of the WA Naturalists Club for advice and support. Once vouchered your collections will be accessible to researchers all over the world and eventually someone will name your fungi. If any of them are new species they may even be named after you!

Fungimap

Fungimap is a scheme that provides a good introduction to the study of fungi by focussing on easily recognisable fungi while at the same time contributing to knowledge of their distribution, habitat and fruiting time. It is a volunteer group working closely with mycologists and aims to map the distribution and occurrence of 100 target species throughout Australia. To learn more about Fungimap or to join the scheme and receive updates you can contact the WA Coordinator: Katrina Syme c/- RMB 1020 South Coast Hwy DENMARK WA 6333 Phone: (08) 9848 1293 E-mail: syme@westnet.com.au

Fungal Study Group of the WA Naturalist's Club

Due to the high level of interest in fungi in WA, this group formed following the inaugural Fungimap conference held in Denmark in 2001. The group organises fungi forays and workshops and actively promotes the study of fungi to help increase awareness. Contact (08) 9228 2495 or e-mail wanats@inet.net.au for further information.

Useful references

Bougher, N.L. and Syme, K. (1998). *Fungi of Southern Australia*. University of Western Australia Press, Perth.

Fuhrer, B.A. (2001). *A Field Companion to Australian Fungi Revised Edition*. Blooming Books, Melbourne.

Griffiths, K. (1985). *A Field Guide to the Larger Fungi of the Darling Scarp and South West of Western Australia*. Self published, Perth.

Robinson, R. (2003). *Fungi of the South-West Forests*. Department of Conservation and Land Management, Kensington.

Fungimap (2001) Compendium of Fungimap Targets. Version 1.0 or later (CD-ROM). See <http://fungimap.rbg.vic.gov.au/cdrom.html>

FungiBank – an online information site about Australia's rich resource bank of native fungi, their importance, and their restoration in revegetation. See <http://www.fungibank.csiro.au>

Fungimap – a project to map the distribution and occurrence of easily recognised Australian fungi. See <http://www.rbg.vic.gov.au/fungimap/>

Fungi and their Kingdoms & Australian Fungi and the Environment posters. Available free from the Environment Australia website <http://www.ea.gov.au/about/publications/list.html#posters> or by calling 1800 803 772.

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