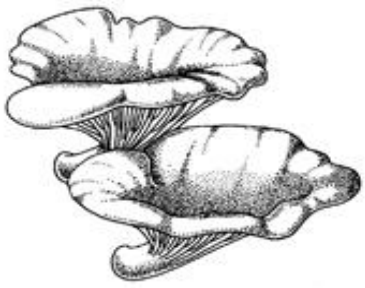
www.fungiperth.org.au



Perth
Urban
Bushland
Fungi

Fungi Manual

For

2009 Bush Skills for the Hills Workshop

Western Australian Naturalists Club

Urban Bushland Council WA Inc

Department of Environment and Conservation

Perth
Urban
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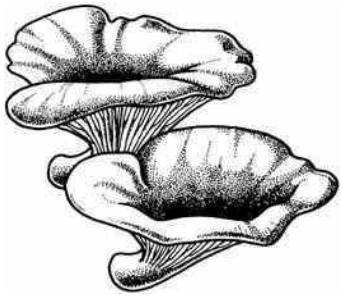
Fungi



PUBF Fungi Manual

Perth
Urban
Bushland
Fungi

The Perth Urban Bushland Fungi project (PUBF) primarily aims to raise awareness about fungi and their importance and role in bushland management, and to increase community skills for undertaking surveys of fungi.

PUBF Fungi Manual written/produced by Neale L. Bougher

Photos by Neale L. Bougher

Practical sessions demonstrated by

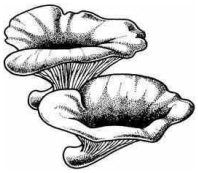
Neale Bougher, Roz Hart, Aruni Jayasekera, and Group Leaders

of the Perth Urban Bushland Fungi Project

PUBF Website at **www.fungiperth.org.au**

Disclaimer

Information about fungi and their edibility and/or poisonous nature is provided only as a guide. The producers of this booklet and demonstrators of the associated practical sessions accept no responsibility for any consequences of people either correctly or wrongly identifying fungi or experiencing ill effects from using or eating fungi.



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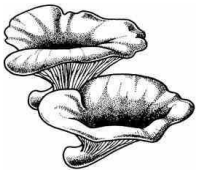


Why do fungi matter?

"Fungal networks effectively bind soils, plants and animals into a healthy, cohesive system"

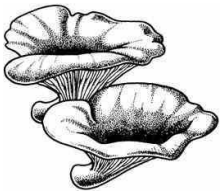
What fungi do for maintaining the health of bushlands

Fungi benefit ecosystems via their vast networks of threads (mycelium), and therefore their actions occur mostly out of sight. Fungi take part in critical processes for landscape sustainability such as nutrient recycling, and beneficial partnerships with plants and animals. (see more on page 6).

Main Ecological Types of Fungi

Decomposer fungi obtain their energy and nutrients by breaking down dead organic matter such as in soil, litter, dung, and wood.		*Agaricus campestris*
Disease fungi derive their energy and nutrients from living organisms. These fungi invade and commonly kill trees, insects and other organisms.		*Laetiporus portentosus*
Mycorrhizal fungi form mutually beneficial associations with plants. Both partners benefit in some way.		*Cortinarius subarcheri*

Fungi Facts



How many native fungi are in Australia?

Australia has many times more fungi than plants. Perhaps **250,000** fungi.

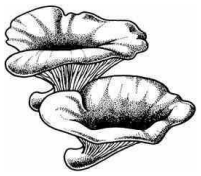
Possibly only about **5-10%** are discovered and named to date.

We may have about **5,000** larger fungi in Australia.

Australia has a huge number of endemic **truffles**. It is estimated that we have between about 1,200-2,400 species with only about 10-25 % of these truffle species known so far.

Some points about native fungi in the Perth Region

1. The diversity of fungi in the region probably rivals that of the wetter regions of Australia.
2. A majority of the local fungi are yet to be discovered, well-defined or named.
3. Mycorrhizal fungi form partnerships with many local plants, e.g. *gums, wattles, sheoaks, orchids*.
4. Poor quality native vegetation has relatively few native fungi.
5. Few larger native fungi occur in housing areas or gardens.
6. In regions with little remaining native vegetation, many native fungi may take a very long time, if they ever do, to re-establish themselves unaided in revegetation.



TIPS ABOUT IDENTIFYING AUSTRALIAN FUNGI

- **Colour and size of fungi vary** according to environmental conditions and are not *always* reliable characters for determining differences between species.

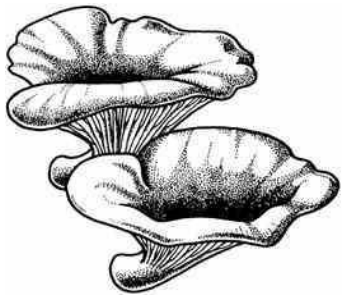
- **Shapes and forms of fungi vary** and may not always fall into discrete categories and may sometimes overlap the defined boundaries of genera and species.

- **Many Australian fungi are unique.** Only some Australian fungi are the same as those in overseas countries. Even fungi that closely resemble European or North American fungi are often different species.

- **Do not expect to be able to key out and/or put a name on every fungus.** Comprehensive, accurate descriptions are not available for most Australian fungi. Keys are not available for most groups. Also, many Australian fungi are yet to be discovered and named, and so there are no published data about those.

- **Field guides:** There are not many field guides about Australian fungi, and these all deal with only a small representation of our fungi. Field guides about overseas fungi are only of limited use because many Australian fungi are unique.

A list of some useful books, CD's and web sites is provided at the end of this booklet.



See the
Perth Fungi Field Book
at
www.fungiperth.org.au

WHAT ARE FUNGI?

The word "fungi" *(plural)* "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.

Fungi in the scheme of Life

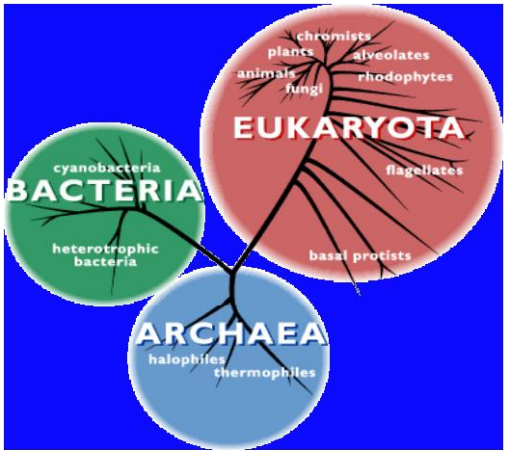
A two-Kingdom system for all organisms proposed by Linnaeus – *Plantae* and *Animalia* – was used for many centuries. More recently, the most commonly used scheme divided all living organisms into 5 Kingdoms:

Prokaryotes (Their cells do not have their DNA enclosed within a nucleus)

1. *Monera* (Bacteria)

Eukaryotes (Their cells do have their DNA enclosed within a nucleus)

2. *Protista*
3. *Fungi*
4. *Plantae*
5. *Animalia*



However more recent interpretations of Life (e.g. diagram) define three **Domains of Life**. Prokaryotes with 2 Domains – Bacteria and Archaea, and Eukaryotes with 1 domain.

Fungi have been traditionally grouped with plants. Now it is realised that Fungi have their own Kingdom, and are closer to animals than plants in the *tree of life* (see diagram).
Today we still refer to "Flora and Fauna" in conservation and management of our bushland.
Now it is time to update to the three F's - **"Flora, Fauna, and Fungi"**.

Organisms loosely referred to as " Fungi" are now scattered over at least 3 Kingdoms - *Protista*, *Stramenophila*, and *Fungi.*

Kingdom: Protista: Slime Moulds

Kingdom: Stramenophila: Includes Oomycetes such as *Phytophthora* (cause of jarrah dieback) which is more closely related to algal members of Kingdom Protista than to Kingdom Fungi.

Kingdom: Fungi: the 'true fungi'. All the larger fungi such as mushrooms and toadstools, and a vast number of moulds belong in the Kingdom Fungi. The Kingdom Fungi has 5 groups or phyla. Members of the first two - Chytridiomycota and Deuteromycota - are microscopic. Larger fungi are found in the Ascomycota and Basidiomycota. A minor number of truffle-like members also occur in the Zygomycetes and Glomeromycetes – these two groups that are predominantly microscopic.

Slime moulds & 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 are unable to live apart. Leaf-like forms of lichens may be mistaken for larger fungi.

Slime mould

Lichen

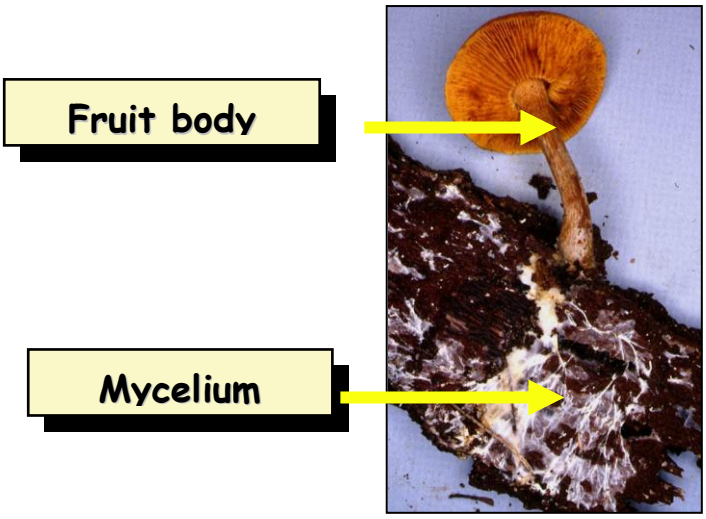
Structure of fungi

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'. 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.

Fruit Bodies

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/fruiting has been completed whereas most fungi cannot easily be detected before and after fruiting. Usually the only obvious part of fungal life cycles is when they fruit.



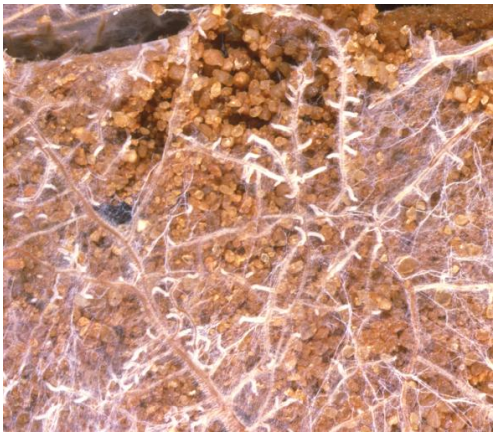
Why do fungi matter?

Fungi cycle precious nutrients

Nutrient cycling is the continuous supply, capture, replenishment and distribution of carbon and minerals. This is fundamental for the ongoing health and vitality of ecosystems. Fungi are significant in nutrient cycling, as they capture, store, release and recycle carbon and other nutrients (e.g. phosphorus, nitrogen, sulphur, copper etc...).

Fungi decompose litter and debris

Fungi decompose dead organic matter, attack living plants, produce wood rots making nutrients available to plants, and return organic matter to soil. A key role for fungi is their capacity to decompose major plant components - particularly lignin and cellulose (the major components of plant cell walls). Fungi are dominant decomposers and nutrient recyclers of forest litter and debris. Without decomposer fungi we would soon be buried in debris.



Mycorrhizal roots on a eucalypt

Fungi partner plants

Fungi have symbiotic (mutually beneficial) partnerships with many plants. Fungal networks act like an extra root system taking up, transforming and transporting nutrients from soil and delivering them to plant roots. The so-called **mycorrhiza "fungus-root"** systems are often superior to roots alone. The fungi can capture nutrients in the soil far distant from roots. The fungi benefit as the plants supply sugars to them. Many of the world's plants partner mycorrhizal fungi. In Australia hundreds of different native mycorrhizal fungi partner plants such as **eucalypts, sheoaks, wattles, orchids, and poison peas.**

Fungi feed animals

In Australia, **truffle fungi** (those fungi with underground fruit bodies) are more diverse than anywhere else in the world. Small native marsupials such as **Woylies, Potoroos and Bandicoots** are lured by aromas to dig up and eat spore-bearing truffle fruit bodies. The truffle spores pass unharmed through the gut, and are deposited in dung potentially far from the original site of consumption. The **fungus benefits** by dispersal of its spores. The **animal benefits** from the nutritional value of the fruit body. To reestablish animals like potoroos in bushlands in the future, we need to reestablish their fungal food with the revegetation.

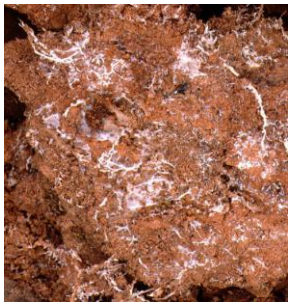
Fungi are also eaten by myriads of small soil animals such as **insects**. These animals are important to soil organic matter and to the food web which feeds larger animals and birds.

Australia's most endangered mammal: Gilbert's potoroo is almost 100% dependent on fungi as food all year round.

Fungi do many other useful things

These include –

- **Binding of soil particles** by their mycelium which contributes to soil structure and erosion control.
- **Lichens** (fungi-algae or fungi-cyanobacteria associations) contributing to nitrogen fixation and to the soil crust flora.
- **Buffering of plants** against environmental stresses, e.g. helping to protect plants against diseases.



MANAGEMENT OF FUNGI IN BUSHLANDS

• Why include Fungi in Management of Bushland?

1. **Biodiversity** – many more fungi than plant species in any bushland.
2. **Ecological Functions** – crucial roles of fungi, including interacting with other organisms to keep bushland healthy.
3. **Provide an indication** - Is the ecology and biodiversity of your bushland in balance for long-term health?

• Survey & Inventory of Fungi: Initial phase of Management

1. Baseline to monitor change: e.g. effects of major disturbances such as fire, and success of management.
2. Mechanism is now available for undertaking surveys and producing permanent and accessible reports.
3. Minimal knowledge level about fungi only required to undertake surveys.
4. Suited to annual involvement of Friends Groups and volunteers from local community.

• Recognizing and Monitoring Ecological Types of Fungi

1. **Beneficial fungi** – e.g. mycorrhizal partners of plants, and decomposer fungi.
2. **Disease fungi** and early diagnosis – e.g. *Armillaria* (see page J-2 of Perth Fungi Field Book at www.fungiperth.org.au)
3. **Weed fungi** – e.g. WA's Magpie Fungus (see page J-5 of Perth Fungi Field Book at www.fungiperth.org.au)
4. **Rare and endangered fungi** – e.g. ancient Gondwanan relics (see page J-12 of Perth Fungi Field Book at www.fungiperth.org.au)

The pink-gilled Amanita – *Amanita carneiphylla* – one of the many beneficial mycorrhizal fungi partnering native plants in Perth bushland. This fungus is listed and coded as "protected Priority Flora" under the Wildlife Conservation Act.

The Australian Honey Fungus - *Armillaria luteobubalina* is a fairly common disease fungus in the Perth region.

GUIDE FOR COLLECTING,& RECORDING FUNGI

The following outline is a guide to collecting and recording fungi in a well planned and ordered fashion so as to achieve a high standard of information. For example, data about fungi and their environment, particularly associated plants and soil, needs to be recorded at the time of collection as it is often impossible to retrieve such data at a later date. Morphological characteristics such as shapes, textures and colours are required for identifying fungi and these need to be recorded with fungi in their **fresh condition**.

If recorded in a systematic fashion, fungal and environmental information may be put together into a valuable database about particular fungi. The value of the information may be greatly enhanced by preservation of fruit bodies in a **Herbarium**.

Photographs are a very important part of the recording process as they show the colours and shape of the fresh specimen.

Use a **recording sheet** to standardise the data collected and to ensure that all relevant data is collected for each entry. A copy of the recording sheet used by the Perth Urban Bushland Fungi Project as provided can be reproduced for use.

Gear which can be useful when recording and examining fungi fruit bodies

Only eyes, camera and bare hands are needed ...*or* …

- recording sheet in clipboard
- field guide to help identify fungi
- pocket knife or trowel for unearthing entire specimens
- magnifying hand lens
- small note book for recording data in the field
- containers, wax wrap & paper bags for specimens
- truffle fork for finding truffles
- map or GPS for establishing geographic location
- camera with macro lens and small tripod
- ruler for measuring fungi
- brush for cleaning dirt off specimens
- white paper for spore prints

ONLY collect if you have a real purpose

Otherwise

LOOK and LEAVE

You do need a LICENCE to collect FUNGI

A hand-held rake or fork can be used to reveal fungi hidden within and below the litter and to unearth truffles such as the bunch of *Mesophellia* truffles pictured here.

FINDING FUNGI

When to see fungi

Fungi may fruit at any time of the year but in temperate regions they are most abundant after the first heavy rains. Fruit bodies of fungi are produced intermittently in response to rainfall and temperature. Some fungi fruit every year, while others do not. Hence the absence of fruit bodies of a particular species in a specific area at any point in time does not necessarily confirm that its mycelium network is absent in the area. The fruit bodies are mostly ephemeral structures which may occur for weeks or only days or hours.

When to see fungi in the Perth Region

Fungi may fruit at any time of the year in temperate regions such as Perth, but locally there can be at least two distinct, but highly variable fruiting periods:

February to April: There are often one or more brief seasonal flushes of fungi in Perth's parks, lawns and gardens during the early months of the year. Warm, humid days coinciding with bursts of rain will often entice the fruiting bodies of fungi to appear. Many respond rapidly, fruit briefly and disappear, such as some of the Ink Cap species.

May to July: Most of the fungal fruiting bodies in Perth's bushlands do not appear until after the onset of substantial autumn rains. Mid June to mid July is usually the peak time to search for bushland fungi in the Perth region, but any time within mid-May through to late July is usually a fruitful period. Several early-season species of large boletes often herald the start of the local bushland fungi season, usually in May. Other fungi appear in succession for various lengths of time over the duration of the season.

Searching for fungi

Mushrooms and toadstools can occur out in the open or well hidden in litter or under a shrub or log etc... or on logs or tree trunks well above the ground. They may be conspicuously coloured or drab/dull. They may be quite large or very small. **Truffle fungi** may be found by using a three pronged fork or similar gardening implement. In general most of their fruit bodies occur within 10 cm of the soil surface.

Eyes can be tuned to recognise **cracks or raised bumps in the ground**. Typical of many of Australia's fungi, this *Russula* was well submerged below the soil (left) before the specimens were extracted (right).

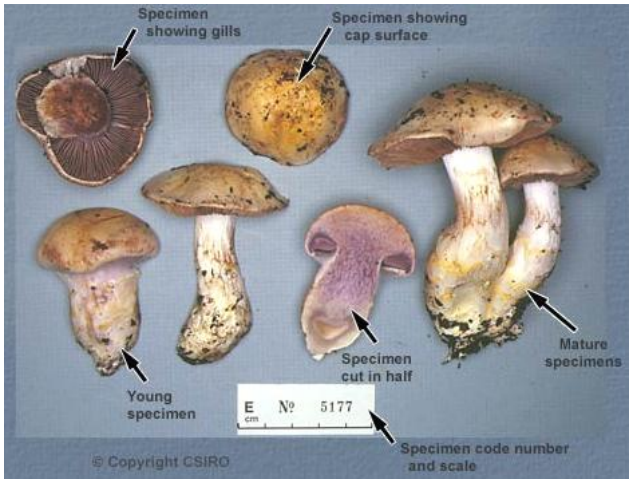
Photographing fungi

Photos in the Field

Photographs taken in the field are scientifically valuable as they show the fungus in its habitat. Take at least one photo of every specimen you record, even if you are quite confident of the identity of the fungus.

Photos are important for building a bank of fungi data. It helps to use a numbering system so that the photo has a number in the picture that can be linked to the same number on the record sheet when you examine the data later on. We have found **numbered sticky spots** work well, as seen in the photo below with a **scale ruler**. Close up photos are needed to reveal fine details of the fungi. However, unless your camera has the capability to lock down to small apertures (e.g. f 16, 22 or greater), it is best not to get ultra close because the depth of field will be increasingly limited the closer in you get.

The use of digital images means that you can take several photos to show different features of the fungus, or to make sure that your photos are in focus and then edit the photos later, for no extra cost. It is important to show as many features of the fungus in one photo as possible. If there are several specimens, carefully dig one up and lay it upside down next to another so that you can show both top and underneath of the fungus in the one photo. If there is only one individual fungus, it is often possible to use a **mirror** to show both top and underneath at once. This does take some practice and it is important to monitor what else is in the photo in the mirror.



A *Cortinarius* species photographed in a manner to keep as a quality image record for permanent reference.

More detailed Photographs

To complement field photos, a more complete scientific record can be achieved indoors by photographing young, mature, and old specimens on a grey or neutral background. It is also a good idea to include a scale and a unique collection reference number for the specimen in the photograph.

Image extracted from FungiBank at www.FungiBank.csiro.au

Collecting a fungus

Extract the whole fruit body including the base of the stalk by using a small knife or other instrument to dig well under and into the soil and immediately place in a bag to prevent desiccation. A 'good collection' of a fungus consists of at least several fruit bodies of the same species, preferably young and mature specimens at different stages of development, collected at the same place and at the same time.

	Rotting or maggot-infested specimens should be discarded. In this case a parasitic mould fungus has grown over a bolete, and these specimens would not be worth collecting.
Plastic utility or fishing boxes are useful alternative for collecting small fungi. By inserting strips of paper in each compartment, it is possible to make spore prints of the fungi immediately upon collecting them and before they dry out. However do not store fungi in such containers for too long as increasing condensation and moisture may accelerate their decay.	

Main steps for collecting and initial processing of fungi

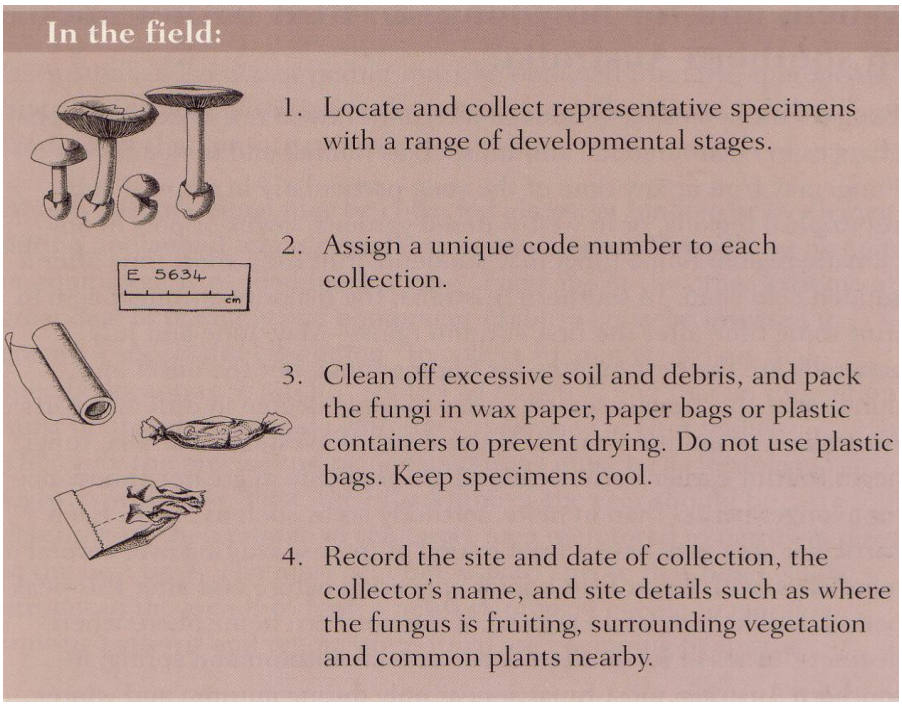


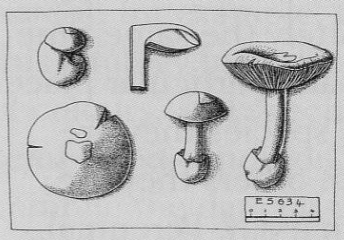
Image extracted from the book Fungi of Southern Australia (Bougher & Syme 1998).

What to do with fungi you collect

(*Aside from eating them – not recommended unless you are certain of what you are doing*)

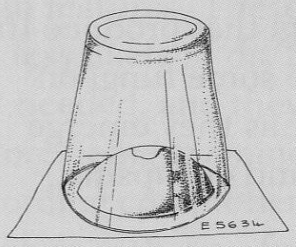
In the laboratory:

5. Examine, draw, and record characteristics of the fungi such as shapes, textures and colours, giving particular attention to variations with age.



6. Take colour photographs showing young, mature, and old specimens, some in longitudinal section, on a standard background with a scale.

7. Set up a spore print on white paper (may need to do this first, e.g. if small specimens).



8. Before air-drying the specimens: cut one or two fruit bodies of mushroom-like fungi longitudinally; cut all truffle-like fungi in half.

9. After thorough drying is completed, package the specimens and spore prints in a labelled paper bag, envelope, or plastic zip-lock bag. Store them in a dry environment.

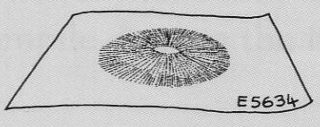


Image extracted from the book Fungi of Southern Australia (Bougher & Syme 1998).

Recording shapes, sizes, and colours

Morphological features such as shapes, textures and colours are useful for identifying fungi and need to be recorded with fungi in their fresh condition. A recording sheet is provided in this booklet.

Some of the main features are:

Cap and stem: size, shape, colour, surface texture and moisture.

Gills: size, shape, colour, how attached to the stem.

Partial veil: (ring or covering over gills): presence or absence, form.

Universal veil: (patches on cap or cup at base of stem): presence or absence, form.

Flesh: colour, texture, bruising.

Odour and taste:

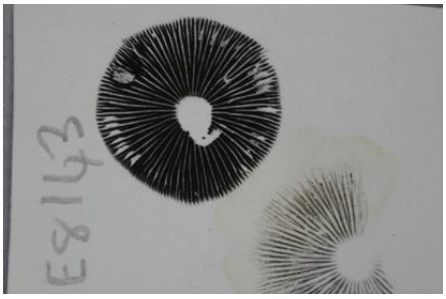
Spore print colour:

Making spore prints

A spore print can be made by placing a mushroom cap which is mature but not too old, with the stem removed and the spore-bearing gills facing down, onto white paper. It can be covered with paper or glass for protection against air movements and desiccation. A drop of water placed near the fungus may help to prevent drying out. After a period of one hour to overnight (depending on the size and condition of the specimen), the spores should have been deposited on the paper. They adhere to the paper by static electricity but can be easily brushed off and therefore require some protection. The colour of the deposit itself is useful for broad identification purposes, and the spores can be used later for microscopic examination. Spore print colour should be noted as soon as possible as they may change colour on drying, and may change further after lengthy periods of storage. Label the spore print paper with the name and/or code number of the fungal collection, allow the paper to dry out, then fold it in half with the spore deposit facing inwards. Store spore prints with the corresponding fruit bodies.

Spore prints can be made from many types of fungi such as mushrooms, brackets, corals and clubs. Truffle-like fungi generally do not produce spore prints.

Salmon spore print of *Volvariella*



Black spore print of *Panaeolus*

Preserving fungi for permanent herbarium specimens

Air drying is the best method of preserving fungi.

Air drying can best be achieved with commercially available electrical units designed for drying fruit or herbs. These have a heating element and blow warm air through a series of plastic grid trays.

Tips about drying fungi specimens

- It is important **not to cook specimens** by overheating them as this may destroy structures needed later for identification. **40 to 50°C is adequate.**
- **Heating overnight is sufficient** for drying most fungi.
- Large and woody specimens **take longer**.
- It is best to **slice all specimens**, particularly large specimens to encourage thorough drying**.**

Air-dried fruit bodies often have little resemblance to the fresh fruit bodies. However, microscopic characters of the fungi that are useful for identification are preserved in the samples. Fruit bodies of air-dried fungi can be **stored permanently for future reference**. If at any time fungi are found to have rehydrated, the specimens can be removed from their packet and put on an air drier for an hour or until dry once again.

The difference between Ascomycetes and Basidiomycetes

The **first step for identifying the larger fungi** is to decide whether a specimen is an **Ascomycete** or a **Basidiomycete**. Sexual reproduction in the Ascomycetes is by microscopic sacks or tubes called asci producing ascospores, and in Basidiomycetes it is by microscopic structures called basidia producing basidiospores. Each Ascomycete fruit body may have thousands of asci, e.g. lining the concave surface of a cup-shaped fruit body or coating the surface of a tongue-shaped fruit body. Each Basidiomycete fruit body may have thousands of basidia, e.g. lining the surface of the gills of a mushroom or occupying the inside of a puffball.

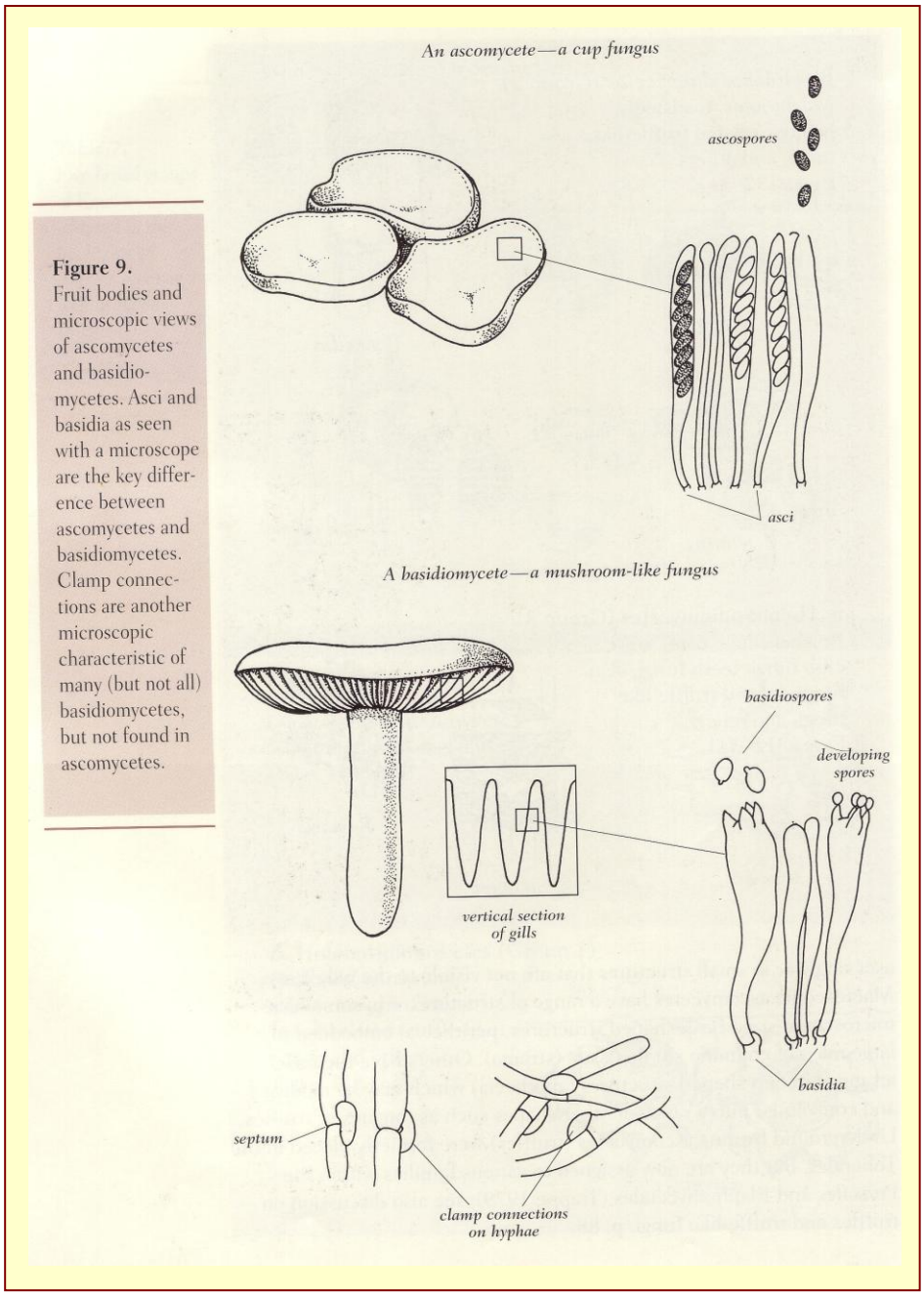


Figure 9. Fruit bodies and microscopic views of ascomycetes and basidiomycetes. Asci and basidia as seen with a microscope are the key difference between ascomycetes and basidiomycetes. Clamp connections are another microscopic characteristic of many (but not all) basidiomycetes, but not found in ascomycetes.

Extracted from the book Fungi of Southern Australia (Bougher and Syme 1998)

Some distinctive main types of fungi

Ascomycetes

Cup fungi

Morels

Earth Tongues

Truffles (Ascomycetes)

Basidiomycetes

Jelly Fungi

Birds Nest Fungi

Earth Balls

Puffballs

Stinkhorns

Earth Stars

Gilled Mushrooms

Mushrooms with Pores (Boletes)

Truffles (Basidiomycetes)

Bracket Fungi (Polypores)

Coral Fungi

Teeth Fungi

Skin Fungi (Resupinate Fungi)

Some distinctive species of fungi to learn

Another way to learn about fungi is to focus on recognising a few distinctive species.

Ghost Fungus

Omphalotus nidiformis

Scarlet Bracket Fungus

Pycnoporus coccineus

Golden Wood Fungus

Gymnopilus allantopus (*austrosapineus*)

Pink-spored Volvaria

Volvariella speciosa

Curry Punk Fungus

Piptoporus australiensis

Punk Fungus

Laetiporus portentosus

Magpie Fungus

Coprinus cf. stanglianus

Dog Poo Fungus

Pisolithus species

5 common Genera of gilled mushrooms

In learning how to identify fungi it is useful to at least recognise some of the more frequently encountered genera of fungi.

Amanita

- **Spore print white to cream**
- On ground
- Veil patches on cap and/ or ring on stem.
- Cup (volva) often at base of stem
- Gills usually free
- Spores smooth, sometimes blue in Melzers reagent (iodine)

Coprinus (Ink Caps)

- **Spore print black**
- On ground, dung, wood or litter
- Mushrooms auto-digest, become inky
- Gills usually attached
- Spores usually smooth, with a germ pore

Cortinarius

- **Spore print rusty or ochre brown**
- On ground
- Cobweb-like veil on upper stem when young
- Gills attached
- Spores ornamented

Mycena

- **Spore print white to cream**
- On ground or wood or litter
- No veil patches on cap or ring on stem.
- Gills attached
- Typically small and slender
- Caps often conical or bell-shaped
- Spores smooth

Russula

- **Spore print white to cream**
- On ground
- No veil patches on cap or ring on stem.
- Gills attached
- Texture chalky, snaps
- Spores ornamented and blue in Melzers reagent (iodine)
- Closest relative is *Lactarius* which exudes latex when cut.

Books and other useful References

Some books and CD's about Australian fungi

Aberdeen, JEC. (1979). **Introduction to the Mushrooms, Toadstools and Larger Fungi of Queensland.** Queensland Naturalists Club, Brisbane.

Bougher, N.L., (2007). **Perth Urban Bushland Fungi Field Book.** PUBF, Perth. (A self-managed format, on-line at www.fungiperth.org.au).

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Wood, A. (1990). **Australian Mushrooms and Toadstools: How to identify them** (rev. ed.). New South Wales Uni Press, Sydney.

Young AM. (2005). **A Field Guide to the Fungi of Australia.** New South Wales Univ. Press, Sydney.

A helpful book series on how to identify and work with larger fungi

Largent, D.L. (1977a). **How to Identify Mushrooms to Genus I: Macroscopic features.** (Mad River Press Inc., Eureka.)

Largent D.L. (1977b). **How to Identify Mushrooms to Genus III: Microscopic Features.** (MRP Inc., Eureka.)

Largent D.L. and Baroni, T.J. (1988). **How to Identify Mushrooms to Genus VI: Modern Genera.** (MRP Inc., Eureka.)

Largent D.L. and Thiers, H.D. (1977). **How to Identify Mushrooms to Genus II: Field ID of Genera.** (MRP Inc., Eureka.)

Stuntz, D.E., (1977). **How to Identify Mushrooms to Genus IV: Keys to Families and Genera.** (MRP Inc., Eureka.)

A couple of easy-to-read books about fungi

Arora, D. (1986). **Mushrooms Demystified.** (Ten Speed Press: Berkeley.)

Kendrick, B. (1992). **The Fifth Kingdom.** (Focus Information Group Inc., Newburyport).

Growing edible fungi

Stamets, P. (1993). **Growing Gourmet and Medicinal Mushrooms.** (Ten Speed Press, Berkeley.)

Some of the many useful websites about fungi

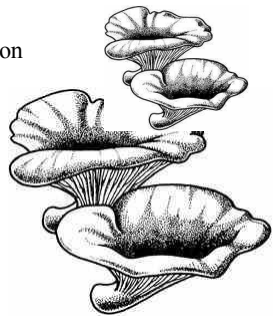
Perth Urban Bushland Fungi – Including Fungi Field Book for Perth Region and Beyond http://fungiperth.org.au

Fungimap – A project to map the locations of Australian fungi http://fungimap.rbg.vic.gov.au/

FungiBank – online resource of information about Australia's rich resource bank of native fungi for revegetation http://www.fungibank.csiro.au

Perth Urban Bushland Fungi Manual

Notes



See the PUBF Website & new PUBF Field Book "Fungi of the Perth Region and Beyond"

at

www.fungiperth.org.au

