MAY 2003

AUSTRALIA'S FUNGI MAPPING SCHEME

fungimapnewsletter 19

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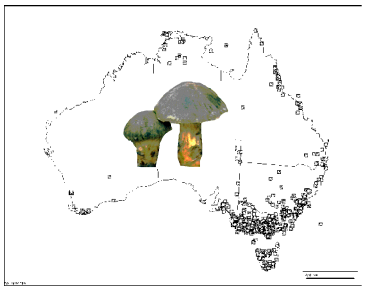


F.N.C.V.

Royal Botanic Gardens Melbourne

News from the Fungimap Coordinator

I am being kept busy organising the 2nd National Fungimap Conference, which will be held in Victoria in May. There are 90 Fungimappers from around Australia (and even a few from overseas!) planning to attend, and we are all looking forward to a wonderful time with talks, forays and workshops. With recent heavy rainfall fungi are very plentiful in the area at the moment, so we are hoping for some more rain before the conference!

I have included the talks programme for the Friday on page 7, and also transcripts of two talks from the 1st National Fungimap Conference to give you an idea of the style of the presentations. They are for a general audience, and no prior knowledge of fungi is assumed. I am still happy to accept registrations for this day if you would like to come; please contact me as soon as possible to book so I can ensure there will be food for you!

The other exciting development is a workshop in Queensland, being held in Maleny, near Brisbane. Thank-you to everyone who responded to the notice in the previous newsletter: this workshop is going ahead, and I encourage anyone in the area to attend.

Finally, the fungi season is beginning, so check the calendar on page 11 to get involved with activities in your area, and keep in touch with your Regional Coordinator.

Gudrun Evans
Fungimap Coordinator

DONATIONS TO KEEP FUNGIMAP RUNNING

There are no subscriptions charged for the *Fungimap Newsletter* or to participate in the scheme. Fungimap relies on grants, donations and volunteer help to produce the Newsletter, CD-ROMS and books, organise activities, and maintain the Fungimap database and website. To support these activities Fungimap is soliciting donations, which will be handled by the Royal Botanic Gardens Melbourne, a longtime supporter of Fungimap. The money will be used to fund production of the *Newsletter* and upkeep of the Fungimap Database. All donations will be issued with a receipt. Donations over $2 are tax deductible.

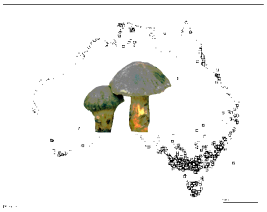
Please make cheques out to: **Royal Botanic Gardens Melbourne** and send to
Fungimap
Royal Botanic Gardens Melbourne
Private Bag 2000
South Yarra, Victoria 3141

QUEENSLAND

WORKSHOP ON BASIC MUSHROOM IDENTIFICATION

Saturday 24th May 2003
10:00am – 2:00pm
Mary Cairncross Training Room, Maleny
Presenters: Nigel Fechner & Dr Tony Young

As the number of participants is limited bookings are essential. To book, call the Mary Cairncross Scenic Reserve on (07) 5499 9907.



CONTACTING FUNGIMAP

Fungimap Central

Royal Botanic Gardens Melbourne
Birdwood Avenue
South Yarra VIC 3141

Coordinator: Gudrun Evans
Telephone: (03) 9252 2374 (Mon – Thurs)
E-mail: fungimap@rbg.vic.gov.au
Website: http://www.rbg.vic.gov.au/fungimap/

Regional Coordinators

These wonderful people contribute their time and experience voluntarily, because they love fungi! They all know lots about fungi, and run workshops and forays from time to time. If you are interested in having a foray or workshop run in your area next season please contact Gudrun.

New South Wales:
Bettye Rees
C/- 10 Lloyd Avenue
Hunters Hill NSW 2110
E-mail: B.Rees@unsw.edu.au

South Australia:
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C/- 72 Eve Road
Bellevue Heights SA 5050
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C/- Geography and Environment
University of Tasmania
GPO Box 252-78
Hobart TAS 7001
E-mail:
smcmulla@postoffice.utas.edu.au

Western Australia (Kimberley Region):
Matt Barrett
E-mail: mbarrett@kpbg.wa.gov.au

INTERESTING GROUPS

Sydney Fungal Studies Group

Fungi forays, talks and workshops in the Sydney area.

Secretary: Donald Gover
5 Dawes Street
Little Bay NSW 2036
Ph: (02) 9661 4898
E-mail: djgover@bigpond.com
Website: http://argus.appsci.unsw.edu.au/fungi/

Adelaide Fungal Studies Group

Monthly meetings and forays during the fungi season.

- **Meetings:** Usually second Tuesday of the month at the Staff Room of the Plant Biodiversity Centre, off Hackney Road, 7.30pm. There will be no meetings from November to February inclusive.
- **Excursions:** Day excursions are normally on the Saturday before the meeting. There will be no excursions from October to March inclusive. Check with Pam before the excursion as venues may change due to special fungal fruiting flushes.

Convenor: Pam Catcheside
Ph: (08) 8222 9379 (w)
E-mail: dpcatchi@arcom.com.au

WA Fungal Studies Groups

The two groups in WA, in different geographical locations, organise events both separately and together.

- A group within the WA Naturalists' Club organises fungal forays, workshops, identification evenings and talks, based in Perth.
  WA Naturalists' Club, PO Box 8257
  Perth Business Centre WA 6849
  E-mail: wanats@iinet.net.au
  Website: http://www.wanats.iinet.net.au/
- The William Bay National Parks Association Fungi Studies Group is based around Denmark, WA.
  Contact is Katrina Syme.
  E-mail: syme@westnet.com.au

INTERESTING WEBSITES

- **Natural Selection**: http://nature.ac.uk/
- **Royal Botanic Gardens Melbourne fungi pages:** http://www.rbg.vic.gov.au/biodiversity/fungi/
- **Taylor Lockwood**: http://www.fungiphoto.com/
- **The Hidden Forest**: http://www.hiddenforest.co.nz/
- **MykoWeb**: http://www.mykoweb.com/
- **Fungi Images on the Net**: http://www.in2.dk/fungi/

The following two articles are transcripts of talks presented at the 1st National Fungimap Conference in Denmark, WA. They were originally accompanied by many more illustrations than we can include here. We have included a small selection of images for Teresa's talk, and a list of references which the images used in Roger's talk came from.

UNEARTHING AUSTRALIA'S EXTRAORDINARY TRUFFLES

Dr Teresa Lebel (Royal Botanic Gardens Melbourne)

I admit it. I have a slightly skewed view of the world. On a walk in the bush with friends, while I can appreciate the beauty of the wildlife and plants, my focus is on a group of organisms that many people walk on, step over, kick, or note only fleetingly as a patch of disturbed ground. Most of my friends are zoologists; if they see an animal skull they're excited about what sort of animal it is, the age, how it died, whereas I'm more interested in the fungi, wondering what kind of fungus it is and why its growing where it is. The fungus *Hebeloma aminophilum* grows where there's a carcass or skeleton of a dead animal. This is because it likes high nutrient or high nitrogen substrates. If you like murder mysteries, someone in Japan noticed this particular type of mushroom out in the woods, told various people, so mycologists went to make a collection and dug up some human bodies. It turned out to be a murder site - in this case the fungus was a useful "forensic" indicator.

A truffle pushing up a clump of soil. © Teresa Lebel

What fascinates me are the fungi and hidden truffles and truffle-like fungi. You know those wonderful puffballs and other fungi that as a child you loved to kick and splatter. I hope by the end of my talk to have introduced you to the sometimes weird and often colourful world of these fungi. An example of the weird habits of fungi is the "vegetable caterpillar" or *Cordyceps* which in Australia is found growing on the larvae of various insects. There is even one particular species of *Cordyceps* which only grows on truffles.

What are truffles and truffle-like fungi?

The greater part of the fungus is present year round in the soil as a mass of microscopic filaments, the hyphae. Like most mushrooms, truffles are ephemeral fruit bodies that produce spores by which new colonies of the fungus are established, but unlike mushrooms which fruit above ground, truffles typically have fruit bodies that mature below-ground or at the soil surface. Truffles are distinguished by three main characters:

- The fruitbody is generally produced underground (hypogeal) or at the soil surface.
- The spore bearing tissue is usually completely enclosed by an outer covering (the peridium)
- However the spores are retained until the fruitbody decomposes or is eaten. Unlike the mushrooms, the truffles and truffle-like fungi have lost the ability to actively shoot off their spores - this means you won't get a spore print. In truffles the spores are almost symmetrical, and quite tightly attached to the spore-producing structure (the basidium). As they get more similar to a true mushroom or gilled fungus the spores become a lot more asymmetrical and much more easily broken off and shot off into the air stream. So truffles don't easily release their spores.

Dispersal

Unlike many above-ground fruiting fungi which can have their spores dispersed by wind, rain or animals fairly easily, truffles are underground or partially buried and completely enclosed. So how do they disperse their spores? You've all seen *Pisolithus*, a puffball, growing along the roadside, and probably given it a good kick, resulting in the release of a cloud of spores. Humans are very good at dispersing things as we all know, intentionally or unintentionally, and weedy fungi are a problem as are many other introduced plants and animals.

Dispersal of truffle spores: by people and animals ©TeresaLebel

Many truffles have evolved a strategy that depends on animals; they have strong odours and/ or bright colors which act as attractants. Many of our native mammals depend upon fungi and particularly the truffles for food. I fed a possum a piece of truffle, it ate a portion, then spat it out to eat the *Cheetos* that someone else offered! However the recently re-discovered Gilbert's Potoroo from Western Australia and the Long-footed Potoroo from eastern Australia rely on fungi for up to 90% of their diet year

round. So if you want to reintroduce these rare animals you have to work out how to manage the food supply as well. I have succeeded in obtaining research money to look at truffle diversity in the habitat of the Long-footed Potoroo in New South Wales.

Examination of faecal pellets shows that the animals are finding a greater diversity of species (based on spore types) than mycologists scratching around in the same areas. In one particular slide of a squashed-up faecal pellet, I counted over 17 different types of spores. When we went looking for truffles in the same general area in which the faecal pellet was collected, we found maybe 5-10 species of truffles. So the animal was able to find a further 7-12 species. There's something happening, a very strong evolutionary link between the animals and the fungi. The truffle is providing a food source for the animal, the animal eats the fungus and walks away, distributing the spores in its faeces some distance away.

There's not just boring colours and drab fungi underground; in fact many of the truffles have bright colours as well as odd shapes and textures. In some regions, such as New Zealand, many of the truffles are brightly coloured and fruit at the soil surface. An example is *Paurocotylis*, a scarlet truffle that produces fruitbodies under *Podocarpus* trees. The fruitbodies are produced at the same time as the tree is dropping its red fruits. It seems likely that birds would be the dispersal agents of choice here as there are no mammals native to New Zealand for the evolutionary link to have occurred.

Pauroctylis sp. © Teresa Lebel

Of course there's a long tradition of human consumption of truffles, especially in Italy, France and most of Europe. Pigs were traditionally used to hunt for the prized "gourmet" truffles, but you can imagine how difficult it is to push a several hundred kilogram pig away from something it's trying to get to. Many of the older trufflers are missing tips of fingers! So for the most part nowadays they use dogs, as they are easier to train to search for truffles and will allow their owner to gather them with much less fuss.

In Australia this particular group of truffles, the genus *Tuber*, does not occur naturally so people have introduced them. Several "truffieres", using the 'black diamond' or Perigord truffle *Tuber melanosporum*, have been set up in New Zealand, Tasmania, and now in Victoria. If you wanted to set up a truffier to grow truffles yourself you would need several hundred seedlings of hazelnuts or chestnuts (the plant associates) as the truffles are mycorrhizal. You need the fungal inoculum, several kilos of the very expensive fresh truffle you want to introduce, grind it up and pour the spore slurry on the roots, then plant the seedlings. Then you need to sit and hope you've got the right soil type, the right temperatures, all the right conditions and maybe in 4 - 11 years you might find truffles! It's a big investment, but you can see why the interest is there: the truffles would reach the market during a different season - and there is a great deal of money to be made.

The edibility of Australian truffle and truffle-like fungi for humans is largely untested; anecdotal evidence of a very few cases of stomach upset caused by truffle-like fungi is in the literature, usually as cases of mis-identification of truffles. A few species of desert truffles were consumed by Aboriginal peoples in central northern Australia, however few collections exist in herbaria. Unfortunately, no native species belonging to the same genus as the gourmet truffle (*Tuber*), or a culinary rival, has yet been found in Australia. I have to admit that over the past 8-9 years of working on Australian truffles, I haven't tasted anything that resembles the European truffles, in terms of odour, taste and texture.

Size, shape and habit

Most truffles range in size from a marble to ones larger than a tennis ball which can weigh over 400 grams. The fruitbodies range in shape from those with the appearance of an aborted mushroom, to those which look like small pebbles or potatoes. When the fruitbodies are cut in half they can be powdery, gelatinous, sponge-like, or solid with the appearance of marble. Truffles and truffle-like fungi can be confused with mushroom buttons, young puffballs, rocks, seed pods, and even chewing gum!

Many of the truffles form important ectomycorrhizal associations with the roots of nearby plants. This association is beneficial to both the plant and the fungus, involving an exchange of nutrients and water between the two. The fungus forms a mass of hyphae, like a sock, around the root-tip; this is where the exchange occurs. In Australia the majority of trees and many shrubs form mycorrhizal associations, eg. *Eucalyptus*, *Nothofagus*, *Allocasuarina*, and various species of *Acacia*, also *Leptospermum* and *Gastrolobium*. The ectomycorrhizal association is fairly specific, in that fungi which form associations with *Eucalyptus* and other Australian native trees and shrubs will not form mycorrhizae with introduced northern hemisphere trees such as pines or oaks - they have their own suite of fungi. This means that when you find truffles it's a good idea to look around and check what the nearby trees / shrubs are!

Diversity
Partly because of the diversity of habitats and plants, Australia has a very diverse fungal flora and in particular the truffles, as we're finding out. In all of Europe there are approximately 50 genera and 150 species of truffles. In Australia there are 85 genera described with some 300 species. Based on the rate at which we are finding new taxa during recent surveys, the predicted numbers are closer to 110 genera and 900 species. So there's a lot of work to do!

The truffle and truffle-like fruit body form has arisen several times in two quite different lineages of macrofungi: this is apparent in colour, shape, texture of fruit-bodies and microscopic characters. The ascomycetes or cup fungi and allies, produce spores inside a sac-like structure, the ascus. The term truffle applies to all ascomycetes with underground fruitbodies. Some examples of ascomycete truffles we might see in the Denmark area are:

- *Labyrinthomyces varius* - has a very firm texture, darkish exterior, marble-like interior, generally the size of a large marble or golf ball if you're lucky. This genus is endemic to Australia.
- *Peziza whitei* - if you can imagine a cup fungi or paper plate crumpled up to form an irregular ball, white to cream coloured, with a hollow or chambered interior.
- *Elaphomyces* – is a very different - looking fungus. The fruit-body is embedded in a mass of often brightly coloured hyphae and soil, with a firm texture. The outer layer is quite thick and black. The whole interior portion is a mass of powdery spores. This genus is common to Australia with only one described species; we know of another 15 waiting description.

The other main group, the basidiomycetes or mushrooms, puffballs and bracket fungi, produce spores on the outside of a sac-like structure, the basidium. This is the main microscopic character that differentiates the two groups, ascomycetes produce spores inside a sac (ascus), basdiomycetes produce spores on the outside of a sac (basidium). Basidiomycete fungi which produce below ground or emergent fruit-bodies are called the truffle-like fungi or false truffles.

Russulales sp. truffles (top), & *Russula* sp. (below). © Teresa Lebel

Some examples of basidiomycete truffles that we are likely to see in the Denmark area are:

- *Zelleromyces* - You may have seen the gilled fungi *Russula* or *Lactarius*? *Lactarius* is the one that when broken, produces a milky juice. The related genus *Zelleromyces* also produces a milky juice when its broken or cut. There are 4 other genera of truffle-like fungi related to *Russula* and *Lactarius*. Some look like an aborted *Russula*, with what could be irregular gills or pores in the interior, others completely lack any stem tissue, are completely enclosed and the interior doesn't look anything like the gills that you see on the above ground relatives. So there are many macroscopic and microscopic features you can find which will tell you the above ground fruiting fungi to which the truffle-like fungus is related.
- *Cortinarius globuliformis* is a hypogeous *Cortinarius*. It has a dull yellow to bright yellow cap and stem, and a cobwebby veil. However, the veil does not part from the stem. It also has rusty-brown spores and spore ornamentation similar to some above-ground *Cortinarii.*
- *Protoglossum* is also a truffle-like relative of *Cortinarius*. If you've picked up *Cortinarius* in the forest, you will have found that some have very slimy or glutinous caps and stems. This particular truffle has a similar thick slimy/glutinous layer on the outside, and the spores are rusty coloured with similar ornamentation to its above-ground relative.

Protoglossum sp. © Teresa Lebel

- *Torrendia* has a remnant stem, a reduced cap, and a remnant of the veil, generally white in colour and quite fragile. Microscopic features of the spores and veil structures suggest a relationship to *Amanita.*

For many taxa, we know whether they are basidiomycetes or ascomycetes, but we don't know which particular family or genus of aboveground fungi to which they are related. With molecular techniques there is the possibility of figuring out the relationships of some of these "orphans".

I hope you've enjoyed this very general introduction to the truffles and truffle-like fungi. As you can see there's still a lot of work to be done on this diverse group, and many different aspects of interest.

CUP AND SAUCER AND FLASK FUNGI

Roger Hilton

My subject is "Cup and Saucer" and "Flask" fungi. These are the old discomycete and pyrenomycete class of ascomycetes. In the old classifications ascomycetes were one of the divisions of the fungi that were divided up into other big groups, namely in this case discomycete for cup and saucer, pyrenomycete for the flask fungi. These words are old-fashioned and not found in the modern texts, where you'll find that the ascomycetes are divided up into 20 or 30 separate orders, some of which are very well described in the book by Katie and Neale [Bougher, N.L. & Syme, K. (1998), *Fungi of Southern Australia*].

Comparative size of fungi spores

What I want to do today is simply talk about the structure of these two old classes and show how they can be really useful in identifying the fungi that are in Fungimap. The first thing one has to take into account is size. Not enough emphasis is placed on the size of fungus spores; the phenomenon of the ascomycetes is that their spores are much larger than the basidiospores of the mushrooms and toadstools, so that even with a low-powered microscope (maybe 20 times) you can actually satisfy yourself that there are asci there. This is an enormous help because so many disc-like things that you might think are cup and saucer fungi turn out not to be ascos but basidios, and unless you know something about their structure then things could go horribly wrong. Apart from that, it's a very interesting illustration of size and form in biology: the form of many of these organisms that we love, including the fungi, is often determined by the function. [Image 1, 2] Look at the size of a spore of a lichen, which is a discomycete spore associated with the cells of an alga. The smallest seed that we know is this one here, so the biggest fungus spore is nearly as big as the smallest seed. Look at the basiodiospore: quite tiny compared with a discomycete spore. Look at that long thin spore, which is one of the candidate fungi in Fungimap, a *Cordyceps*, actually one of the flask fungi. Having a closer look at the spores on the left: there is the enormous ascus of one of the discomycetes, to the right some asci of pyrenomycetes and further down is the typical structure of the basiodiomycetes, the basidium bearing four little spores.

Different architecture of Cup and Saucer v. Flask fungi

In the cup and saucer fungi, which as their name implies, are open to the air just like the gills of a mushroom or toadstool, the spores are shot off from the asci in maybe hundreds, directly into the air. In fact you can creep up on a discomycete and suddenly breathe on it when it's not expecting it and you see a wonderful discharge of the asci, like white smoke curling up from its surface. How very different from the flask fungi! Their asci are enclosed in a little flask and somehow or other the asci have to reach the neck of the flask and discharge their spores out through the neck into the air. That means that the flask can never be very big. An ascus might be only 1/10th mm long. Thus the flask fungi have a basic limitation to their size unless they have another trick for growing big. As we have seen, the cup and saucers have no limitation to their size because they simply have to eject the asci like peas in a pod being burst and off they go into the air.

The basic cup and saucer fruit body

This is *Ascobolus* [Image 3], a basic disc fungus, you can see the tiny little disc with the naked eye even though it is quite small. There are four or five of those big asci which you can see with a hand lens, and they will discharge their spores directly out into the air; there's no flask neck that they have to reach. Look at the size of the basidiospores illustrated to see the incredible difference in size.

Building a larger fruit body in the Cup and Saucer fungi

[Image 4] This illustration from the book by amazing botanist and mycologist EJH Corner (who died last year), "The Life of Plants", depicts this phenomenon of how you make a big fruit body from little beginnings. At the bottom is something quite small like Ascobolus itself. If you imagine it expanded you get something like those plectanias or anthracobias which Richie showed us when he was talking about the ascomycetes that react to fire. Sometimes the little cup is on the end of a stalk. That's the sort of thing that you'll get in Cookeina, again one of the target species, but what happens in the evolution of discs is that the whole thing gets convoluted in. You can see this is a disc fungus with a little opening and all the spores are discharging inside and it needs something like an animal to break it open and to start eating it for its spores to escape, but it is still classified as a discomycete. Here is the ultimate, and you can see where the whole thing is closed over. This is a truffle. The hymenium (the name we give to the layer of spore-producing organs) is convoluted and fully enclosed so the truffles are entirely dependent on animals for their dispersal. An alternative way of growing big is for the cup to grow to branch so in this very large discomycete several centimetres tall there are "hands" covered with hymenium. Morchella is another target species and you can see how the disc is extended all over the head and has evaginated into subsidiary discs there, so when people ask how you can call that a cup and saucer fungus, this is the answer. So many of the discomycetes in Fungimap are actually unfamiliar to us in the West. Let's read them out: typical cup and saucer fungi: *Banksiamyces*, *Ascocoryne*, *Cookeina* and *Plectania*, I'm sure we've got those here and they are four genera on the list that we're going to be looking for.

Now for the 8 modified discs: ***Leotia*** (the Americans call this "jelly babies"), that's a little stalk with a blob on the tip superficially like many of the flask fungi or myxomycetes even, but if you look at the surface of the blob it's covered with asci producing spores, so you know it's an ascomycete and not a flask fungi so it must be a discomycete. ***Vibrissea*** I don't know, nor ***Chlorovibrissea***. Two ***Morchella*** we've certainly got. ***Helvella***; now that's a

famous one, called the saddle fungus. What happens is that the cup on the *Helvella* drops back on itself so it looks like a saddle and the surface of the saddle has the hymenium from which the spores are produced. ***Underwoodia*** I don't know, but I've seen pictures and know it's a rather shapeless disc fungus again with hymenium surfaces, and unless you know what a hymenium surface is and on the lookout for the asci you wouldn't have much hope of recognizing it. As for ***Cyttaria***, the famous tree morel of the *Nothofagus*, I doubt whether we'll find any of these as it is dependent on *Nothofagus*, which we only know of as a fossil in WA. However the structure of the *Cyttaria* again is very similar to the morel except it grows on the branches of the *Nothofagus*. We have got truffles like the ***Labyrinthomyces*** that Teresa mentioned, but none are target species yet.

The basic Flask fruit body

Turning to flask fungi: here's a typical structure [Image 5], the flask, and you can see it's the flask of *Neurospora*, the famous *Neurospora* on which so much genetic work was done. It would be about 1/2mm high so you can recognise the little flask, but it is quite tiny. Inside are the asci and to send their spores out they've got to stretch up to the neck. They burst and out come the spores and are spread around, then the next one comes and so on, quite different from the cup and saucer fungi. So are they doomed to be microscopic? No.

Building a larger fruit body in the Flask fungi

The flask fungi can become big just as the discomycetes can. How do they do it? They have to combine themselves together in a sterile tissue called the stroma; again from Corner's book [Image 6] you can see the *Neurospora* type and how they can combine together to form a crust. They can be something like this, a stroma with a little flask sunk into it and that is the structure that you have got in target species *Poronia*, which occurs on dung. You can pick out the individual flasks and each one looks like a little *Neurospora*. Now we mentioned *Daldinia*. What happens with daldinias is that the flask is sunk into the stroma and actually unites with the wall so that you have what is called a locule, you can no longer pick out a little flask. Most of these pyrenomycetes are locular including this amazing tropical thing (*Thamnomyces*), where the locules actually obtrude as little flasks sitting on the branch surface.

Looking at our target species we've got in the Fungimap description, there is a reference to the vegetable caterpillars, of which *Cordyceps* is the type. There are a couple of *Cordyceps*, a flask fungus where the flask is set into the stroma and the ascospores are long and thin. Finally the last of the Fungimap target species of ascomycetes, *Hypocreopsis*. *Hypocreopsis* again I haven't seen here, but I'm sure we're going to find it. It is a typical crust fungus. You couldn't really call *Poronia* a crust fungus even though it's classified like that in Fungimap (it's got to be put somewhere!)

A good place to find the cup and saucer and flask fungi is burnt ground. They are common on dung, always on the ground. The cup and saucer fungi are reluctant parasites. The flask fungi are more likely to be parasites or saprophytes on twigs, but some are dung dwellers too.

Images:

1. Size of spores. Fig. 1.1 Ingold, C.T. (1971), *Fungal spores: their liberation and dispersal*.
2. Ascospore size v. Basidiospore. Fig. 11 Bisby, G., Ainsworth, G.C., Hawksworth, D.L. & Sutton, B.C. (1983), *Ainsworth and Bisby's dictionary of the fungi (including the lichens)*.
3. *Ascobolus*. Fig.301B & Fig.302 Langeron, M. & Vanbreuseghem, R. [Translated by Wilkinson, J.] (1965), *Outline of Mycology*.
4. Story of Discomycete. Fig 85 Corner, E.J.H. (1964), *The Life of Plants*.
5. *Neurospora*. Fig.126 Mueller, E. & Loeffler, W. (1976), *Mycology*.
6. Story of Pyrenomycetes. Fig.84 Corner, E.J.H. (1964), *The Life of Plants*.

2ND NATIONAL FUNGIMAP CONFERENCE

TALKS PROGRAMME – FRIDAY 16TH MAY 2003

An Introduction to Fungi
Dr Teresa Lebel, Royal Botanic Gardens Melbourne

The Use of Fungi for Textile Dyes and Paper
Katrina Syme, Fungimap WA Regional Coordinator

Fungimap
Gudrun Evans, Fungimap Coordinator

Cortinarioid Fungi
Dr Neale Bougher, CSIRO Western Australia

Some Common Gymnopilus & How to Recognise Them
Dr Bettye Rees, Fungimap NSW Regional Coordinator

Distribution Patterns of Australian Fungi
Dr Tom May, Royal Botanic Gardens Melbourne

Fungal Hunting in South Australia
Pam Catcheside, Fungimap SA Regional Coordinator

Successful Survey Techniques for Macro Fungi in WA
Dr Richard Robinson, Department of Conservation and Land Management

Tasmanian Alpine Fungi
Sapphire McMullan-Fisher, Fungimap Tasmania Regional Coordinator

Open Forum Discussion on the Future of Fungimap

You are still welcome to attend the Friday talks at the Fungimap Conference: the cost is $75, which includes lunch, morning and afternoon tea. Please contact Gudrun to book, or for further information.

LISTING OF WAXCAP FUNGI UNDER THE NSW *THREATENED SPECIES CONSERVATION ACT*

Tom May (Royal Botanic Gardens Melbourne)

Few Australian fungi are formally listed on conservation schedules. Recently eight waxcaps (Hygrophoraceae) have been listed under the New South Wales *Threatened Species Conservation Act 1995*. Five taxa, all known only from the type locality at Lane Cove, are listed as Endangered (*Camarophyllopsis kearneyi*, *Hygrocybe austropratensis*, *H. collucera*, *H. griseoramosa* and *H. lanecovensis*), and a further three taxa, all known within N.S.W. from three or less localities in the Sydney area, are listed as vulnerable (*Hygrocybe anomala* var. *ianthinomarginata*, *H. aurantipes* and *H. reesiae*). *Hygrocybe reesiae* is very close to the Fungimap target species *H. cheelii* (see *Fungimap Newsletter* 13: 2 and 15: 11). The 'Hygrocybeae Community of Lane Cove Bushland Park' is also listed as an Endangered Ecological Community.

Further Reading

NSW National Parks and Wildlife Service, Threatened Species Conservation Act 1995, Final Determinations of the NSW Scientific Committee. http://www.npws.nsw.gov.au/news/tscdets/index.html

Kearney, R. & Kearney, E. (2000). Significance of the Hygrocybeae community of Lane Cove Bushland park in listings under the *NSW Threatened Species Conservation Act 1995* and under the *Australian Heritage Commission Act 1975*. *Australasian Mycologist* 19: 64-70.

Young, A.M. (1999). The *Hygrocybeae* (fungi, Basidiomycota, Agaricales, Hygrophoraceae) of the Lane Cove Bushland Park, New South Wales. *Austrobaileya* 5: 535-564.

Young, A.M., Kearney, R. & Kearney, E. (2001). Additions to the Hygrophoraceae of Lane Cove Bushland Park. *Australasian Mycologist* 20: 79-86.

ALPINE FUNGUS INVADES KEW

Alison Harcourt, Victoria, May 2002

(This article was submitted in May 2002; my apologies to Alison for the delay in having it printed.)

A few years ago Boroondara Council installed a roundabout at the intersection of Stawell Street and Studley Avenue. Stawell Street runs east-west and on the western side of the intersection where the land drops rapidly the street is split with a steep median strip between the two parts. On each of the other three roads a long narrow triangle with its base towards the centre of the roundabout helps the flow of traffic through the intersection.

At the centre of the rounabout there was[1] a *Eucalyptus caesia* surrounded by vigorous native grasses. The three triangular plots are planted with *Hibbertia dentata* with typical golden guinea flowers. The ground in each triangle is covered with a mulch of woodchips.

Aseroe rubra *© Barbara Baird*

In November 2000 I was walking past the roundabout when I noticed something red in among the golden *Hibbertia*. Curiosity made me look closer and with delight I recognised *Aseroe rubra*, a fungus which I had first met almost eight years previously in January 1983. On that occasion I was part of a group who were walking from Mount Bogong to Mount Wills. We came across *Aseroe rubra* in the undergrowth of a snow gum forest. And, even in the pleasure of meeting an old friend again, I had to admit that the present specimens in Kew were inferior in size and colour to those I'd seen so many years earlier. Nor was this at all surprising, because the Kew sites were more exposed than those of Bogong and consequently they were more susceptible to the dry weather then prevailing. However, I returned next day with a camera and I reported my sighting to Fungimap. Two of the plots contained many specimens, while the third plot (Studley Avenue, southern side) had none at all.

This sounds like the end of the story, but there is a coda. A couple of days after I had taken my photographs we had a good fall of rain, so I went back to see if there had been any changes, of course with a camera and scale. The change was close to miraculous. The tired, desiccated fungi of the previous week had disappeared, to be replaced by a wonderful carpet of *Aseroe rubra* in full spread.

All through 2001 I kept a watch, but to my disappointment it seemed that I had seen a one-off wonder. Imagine my delight when late in October the fungus reappeared. Its spread was reduced, but there was sufficient to make me hope that come this year's spring rains the red starts will shine again.

[1] The site was too unprotected from strong winds; the tree died.

BOOK REVIEW: *Mushrooms of Hawai'i - an identification guide* by Don E. Hemmes and Dennis E. Desjardin

David Ratkowsky

At the 3rd Asia-Pacific Mycological Conference on Biodiversity and Biogeography in Kunming, China (4-7 November 2002) we met the American mycologists Don Hemmes and Dennis Desjardin, the latter known to Genevieve and me by reputation owing to his previous involvement with the family Entolomataceae. We learned that they had just produced a book on the mushrooms of the Hawaiian Islands, and that there were copies for sale at the Conference. We immediately bought a copy for the equivalent of US$39.95, the RRP in America, and repeatedly perused it throughout the remainder of our stay in China (especially as virtually all other printed matter was unintelligible to us!). Here, the book is distributed by Simon & Schuster Australia.

At first glance, a book on Hawaiian mushrooms would not appear to be particularly relevant to a resident of southern Australia. The Hawaiian Islands are the most isolated island group on the planet, located ca. 3,200 km from the nearest high-island group and over 4,000 km from the nearest continent, at latitudes between 18-22ºN of the Equator. The altitudinal range of sea level to ca. 4,200 m on these islands of relatively recent volcanic activity has contributed to a production of biota that is said by the authors to be higher than that in any other region of the world.

The "Australian connection" dates back to the late 1800's, when *Casuarina equisetifolia*, the Australian ironwood, was introduced and planted along coastlines on all islands to reduce wind and salt spray. In the early 1900's, large numbers of *Eucalyptus* species were planted on the major islands. Other frequently planted Australian natives include the Black Wattle *Acacia mearnsii* and various paperbarks and bottlebrushes. Additional introductions of trees from other parts of the world as well as imported soil for lawns and landscaping have contributed to a rich mycota.

Prior to 1990, fewer than 100 species of agarics had been reported from the Hawaiian Islands. In the 1990's, Desjardin and Hemmes initiated a systematic survey of the Hawaiian fungi, resulting in at least 310 species of Agaricales being identified, of which 44 were previously undescribed species. Of these, 291 species are saprotrophic, with only 19 taxa being ectomycorrhizal, all of the latter being associated with exotic trees. Only 52 taxa are thought to represent native Hawaiian species, the remaining 83% being putative introduced species. The low level of occurrence of ectomycorrhizal species is reflected by the reduction to a mere handful of taxa of *Cortinarius* and *Dermocybe*, genera that abound in the Australian eucalypt forests.

Many of the small species of native agarics that are abundant in Hawai'i are in the family Tricholomataceae (e.g. *Marasmius*, *Marasmiellus*, *Mycena*, *Collybia* and in some less familiar segregate genera, e.g. *Gymnopus*, *Callistosporium*, *Hydropus*). The book is by no means confined to "mushrooms", despite its title, with all macrofungi (e.g. brackets, coral fungi, puffballs) being represented in its pages, which contain almost 400 colour photographs. They even include a few rust fungi, lichens and slime moulds, and there are short chapters on medicinal, poisonous, and hallucinogenic mushrooms. Culturing mushrooms at home is briefly covered, and a few pages of recipes are given for those readers who are into the eating of fungi.

For the Fungimapper, any book with a large number of good photos is worth having, irrespective of the region of the world that it covers. The universality of fungal forms and the close relationship between taxa of the different hemispheres (even if the species are not necessarily identical) makes studying the photographs and the descriptions worthwhile. For example, we are intrigued by the photo and description of *Crepidotus stromaticus* (Cooke & Massee) Saccardo that appears on p.72, since the "yellow crep" that we occasionally find on rotting logs in Tasmanian native forests may be this species, which the authors write "is not likely to be confused with other gilled mushrooms that lack a stem". **This fine book includes eight Fungimap species**, one of which is *Aseroe rubra*, first described from Tasmania, which the authors often found associated with *Eucalyptus* in the autumn on all six of the major Hawaiian islands.

Publisher: Ten Speed Press, Berkeley, California (2002). 212pp.

NEWS FROM NSW

Bettye Rees, NSW Regional Coordinator

Most of my time this year has gone into organising an exhibition called "Fascinating Fungi "which is still up and running on weekday mornings at RBG Sydney. This is a general exhibition designed to introduce a wide audience to some of the more common fungal forms, some history to the background of macrofungal taxonomy in Australia and to fungi as pathogens. There is also a large book display, a section on how to find out more about fungi in the Sydney region including information about Fungimap and the Fungimap CD-ROM.

I have handed over my leadership of the Barren Grounds forays to Heino Lepp (ACT Regional Coordinator), and have had to forego leading the Central Coast foray at Ourimbah due to chronic back problems.

EXHIBITION: Fascinating Fungi
Monday – Friday 9:30am – 1:00pm
Royal Botanic Gardens Sydney
Administration Block, near Woolloomooloo Gate
Admission free

NEWS FROM SA

Pam Catcheside, SA Regional Coordinator

The Adelaide Fungal Studies Group is active again for the fungal season, with monthly meetings and forays. Check the calendar of Forthcoming Events on page 11 for details.

NEWS FROM TASMANIA

Sapphire McMullan-Fisher, Tasmania Regional Coordinator

The fungi season is upon us; with fungi popping up in the lawns, gardens and the wet gullies around Hobart. The Bureau of Meteorology give the changes of higher than average rainfall for the next 3 months at 40-45%, so let's hope that means we get average rainfall and we should have a good fungi season. For March most of the state got over 25 mm with the Tasman Peninsula getting over 200 mm! For the southern half of the state that is up to 100 mm higher than is normal for March, whilst the northern half of the state has had 10-25 mm lower than average. Let's hope 25 mm plus is enough to get the fungi going.

I've noticed *Agaricus* species appearing in most lawns and *Marasmius elegans* seems common on the roadsides of forests and woodlands. In the grasslands, gullies, forests and woodlands the fungi season has started, and if the *Omphalina chromacea* I saw recently in heath is anything to go by, the other vegetation types should soon be filled with fungi. I'd like to encourage people to get out in as many types of bush as they can this fungi season and enjoy what a little rain can do.

Mount Wellington Fungal Walk & Workshop

Sunday May 11 2003, 10am – 4pm
Leader: Sapphire McMullan-Fisher

The day starts with a walk up the Mountain, looking for fungal treasures, then return to the University to learn some of the tricks to fungal identification.

The workshop is sun by Adult Education, with the course code **SF3117: Environmental Studies: Fungal Walk**. Apply over the Internet starting at http://www.tafe.tas.edu.au/ae/index.htm, then use the search function and look for fungi. Or ring the Customer Service Centre: Phone (03) 6233 7237.

Please BOOK NOW! If we don't get numbers soon the workshop doesn't run!

NEWS FROM WA

Roz Hart, WA Naturalists' Club

The WA Naturalists' Club Fungal Studies Group is preparing for a busy fungi season, starting with a talk to a general meeting of the Club on Friday 2nd May: Richard Robinson, a CALM mycologist based in Manjimup, will speak on Fungi of the SW forests.

There is a Fungal Foray at Nanga Bush Camp, in the Jarrah forest south of Dwellingup on the June long weekend (31st May – 2nd June). Directions and a map will be available at the May meeting. Katrina Syme and Richard Robinson will be joining us. We will be collecting and identifying fungi and any members with an interest in fungi are welcome. Cost for accommodation will be $70 per person for the long weekend, payable in advance. It is essential to book your place. Please pay Roz at the May General meeting or send your cheque to the Club Office clearly labelled "June Fungal Foray".

On Saturday 14th June the Fungal Studies Group of the WA Naturalists Club, the Friends of Warwick Bushland and guest speakers are presenting "Fun with Fungi" for the general public at Warwick Senior High School & Warwick Open Space Conservation Area, as part of the Skills for Nature Conservation Training Courses.

The 11th International Fungi & Fibre Symposium will be held at Denmark, WA, from 12th – 18th July. Details of workshops and teachers are posted on the website at http://www.greenskills.green.net.au/fungi/. A small group of Scandanavian mycologists are staying in the south west an extra few days for a post-conference field trip. Fungi enthusiasts are invited to participate on the weekend of 19th – 20th July but you must contact Katrina Syme if you wish to take part.

FORTHCOMING EVENTS Please note that these activities are not organised by Fungimap.

Event	Date	Place	State	Contact
WA Naturalists' Club General meeting **Speaker: Richard Robinson** from CALM, Manjimup, will talk on Fungi of the South-west Forests.	Friday 2nd May 2003, 7:30pm	UWA Extension, Clifton Street, Nedlands	WA	WA Naturalists' Club E-mail: wanats@iinet.net.au
Adelaide Fungal Studies Group Foray **Leader: Pam Catcheside**	Saturday 3rd May 2003, 10am	Mount Lofty Botanic Garden	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
17th New Zealand Fungal Foray	Monday 5th May – Saturday 10th May 2003	Kaimai Forest Park	NZ	Paula Wilkie E-mail: wilkiep@LandcareResearch.co.nz
Mount Wellington Fungal Walk and Workshop **Leader: Sapphire McMullan-Fisher**	Sunday 11th May 2003, 10am – 4pm	Mount Wellington	TAS	Adult Education Ph: (03) 6233 7237
Adelaide Fungal Studies Group meeting **Speaker: Mitch Hodgkinson** from Flinders University, SA, will talk on *Mushroom Cultivation*.	Tuesday 13th May 2003, 7:30pm	Plant Biodiversity Centre, Adelaide	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
2nd National Fungimap Conference Hosted by the Field Naturalists Club of Victoria.	Thursday 15th May – Tuesday 20th May 2003	Rawson Village, Gippsland	VIC	Gudrun Evans Ph: (03) 9252 2374 (w) E-mail: fungimap@rbg.vic.gov.au
Workshop on Basic Mushroom Identification **Leaders: Nigel Fechner & Tony Young**	Saturday 24th May 2003, 10:00am – 2:00pm BOOKINGS ESSENTIAL	Mary Cairncross Training Room, Maleny	QLD	Mary Cairncross Scenic Reserve Ph: (07) 5499 9907
Adelaide Fungal Studies Group Foray **Leader: Pam Catcheside**	Saturday 24th May 2003, 10:30am	Deep Creek CP: Stringybark Walking Trail	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
WA Naturalists' Club Fungal Studies Group Fungal Foray in the Jarrah forest at Dwellingup **Leaders: Katrina Syme & Richard Robinson**	Saturday 31st May – Monday 2nd June 2003 BOOKINGS ESSENTIAL	Nanga Bush Camp, S of Dwellingup	WA	WA Naturalists' Club E-mail: wanats@iinet.net.au
Adelaide Fungal Studies Group Foray **Leader: Pam Catcheside**	Saturday 14th June 2003, 10am	Belair NP	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
WA Naturalists' Club Fungal Studies Group & Friends of Warwick Bushland **Fun with Fungi** Skills for Nature Conservation Training Course	Saturday 14th June 2003	Warwick Senior High School & Open Space Conservation Area	WA	WA Naturalists' Club E-mail: wanats@iinet.net.au
Royal Botanic Gardens Melbourne, **Fungi Open House**. Bring specimens or photographs of fungi for identification by RBG Melbourne mycologists Teresa Lebel and Tom May.	Wednesday 18th June 2003, 12-2pm For bulk specimens or photos, make an appointment for 2-4pm.	Mueller Hall, National Herbarium of Victoria	VIC	Tom May Ph: (03) 9252 2319 E-mail: tmay@rbg.vic.gov.au
Adelaide Fungal Studies Group meeting Specimens: identification and discussion.	Wednesday 18th June 2003, 7:30pm	Plant Biodiversity Centre, Adelaide	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
Adelaide Fungal Studies Group Foray with FNSSA **Leader: Pam Catcheside**	Saturday 5h July 2003, 10am	Kuitpo Forest	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
11th International Fungi & Fibre Symposium	Saturday 12th – Friday 18th July 2003	Denmark	WA	E-mail: grskillsdmk@greenskills.green.net.au http://www.greenskills.green.net.au/fungi/
Post-conference Fungi Foray with some Sacandinavian mycologists staying on after the Fungi & Fibre Symposium	Saturday 19th July – Sunday 20th July 2003 BOOKINGS ESSENTIAL	Denmark	WA	Katrina Syme E-mail: syme@westnet.com.au
Adelaide Fungal Studies Group Foray **Leader: Pam Catcheside**	Saturday 19th July 2003, 10am	Cromer CP: Mount Crawford Forest	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
Adelaide Fungal Studies Group Foray **Leader: Pam Catcheside**	Saturday 9th August 2003, 10am	Para Wirra RP	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
Adelaide Fungal Studies Group meeting Specimens: identification and discussion.	Tuesday 12th August 2003, 7:30pm	Plant Biodiversity Centre, Adelaide	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
Friends of the Royal Botanic Gardens Melbourne **Speaker: Tom May**: 'A Mycological Mystery'	Thursday 14th August 2003, 10.30am	Mueller Hall, RBG Melbourne	VIC	Friends RBG Ph: (03) 9650 6398
Adelaide Fungal Studies Group Foray **Leader: Pam Catcheside**	Saturday 13th September 2003, 10am	Scott Creek CP	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
Adelaide Fungal Studies Group meeting Specimens: identification and discussion.	Tuesday 16th September 2003, 7:30pm	Plant Biodiversity Centre, Adelaide	SA	Pam Catcheside Ph: (08) 8222 9379 (w)
Adelaide Fungal Studies Group meeting **Speaker: to be announced.**	Tuesday 14th October 2003, 7:30pm	Plant Biodiversity Centre, Adelaide	SA	Pam Catcheside Ph: (08) 8222 9379 (w)

ACKNOWLEDGEMENTS: FUNGIMAP RECORDERS

Thank-you to everyone who has contributed records, and my apologies to those whose names do not appear on this list. I am working hard to organise the Conference, so record processing has been on hold for a little while. Your names will appear in the next newsletter.

Stein Boddington	1	**SA**		**VIC**	
Patrick Warrington	1	Adelaide FSG	4	Virgil Hubregtse	7
NSW		Uni Carnegie	6	Niels Klazenga	1
Ray & Noreen Baxter	19	Pam & David Catcheside	113	Peter Koster & Cathy Cheadle	12
David Coleby	1	**TAS**		Frances La Fontaine	3
Lisa Fowkes	1	Genevieve Gates	245	Geoff Lay	85
Paul Jones	3	Christine Howells	1	Ivan Margitta	2
Barry Kemp	16	Sarah Lloyd	17	Tom May	102
Sydney FSG	3	Di Williams	7	Lois Prictor	1
QLD		**WA**		Rosemary Robb	28
Anna Walsh	1	Olga Green	1	Wandiligong PS	5
		Patricia Gurry	6		
		Margaret Winchcombe	1		

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Fungimap Newsletters are available in colour on-line at our new website:
http://www.rbg.vic.gov.au/fungimap/

Fungimap is a joint project of the Field Naturalists Club of Victoria and the Royal Botanic Gardens Melbourne.

The Fungimap Newsletter is edited by Gudrun Evans.

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