FLORA

THE LARGER FUNGI

by Katrina Syme

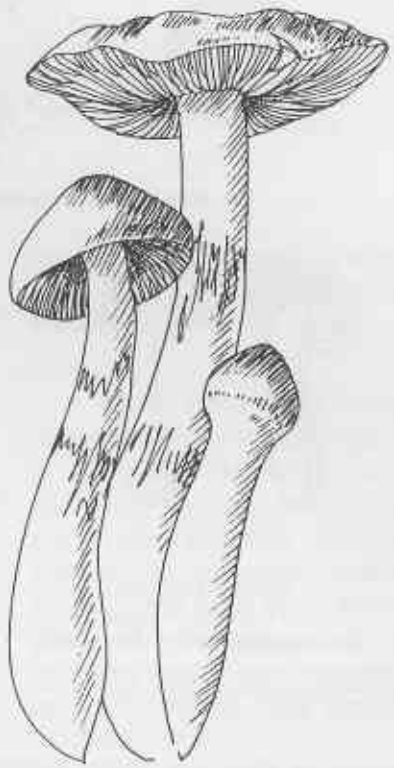
AUSTRALIA has more fungi than plants, yet less than 5% of Australian fungi have been named, and only one State Herbarium in all Australia employs a mycologist.

More than 20 years ago, I lived on a farm in the north-eastern Wheatbelt. Having always been interested in natural history, I fully appreciated the glorious trees, shrubs, wildflowers and orchids growing in patches of bush on the farm and nearby nature reserves. After opening rains we would scour the paddocks for the plentiful crop of mushrooms, but I cannot recall noticing any other fungi. But in the autumn of 1982 the scales fell from my eyes when we went to Tasmania for a holiday and I was enchanted by the colours and forms of the mushrooms and toadstools we saw. Since then, I have discovered that fungi grow everywhere in Australia, even in the Wheatbelt and the desert - they play a vital role in the ecosystem and life on earth could not exist without them. They form an integral link in the great chain of life and healthy ecosystems depend on a diverse fungal flora.

Most fungi are microscopic and include yeasts, penicillin, and fungi familiar to farmers such as Take All, Rust and Smut, which damage cereal crops. The larger fungi have fruiting bodies clearly visible to the naked human eye and we probably have about 5000 species in Australia.

The bulk of the fungus lies within the soil (or substrate such as wood, or living host) and consists of minute fungal threads called hyphae (which form the mycelium) that take in nutrients. Fungi are neither plants nor animals; they do not contain chlorophyll but obtain food by digesting organic matter. They can be broadly divided into three groups: saprophytic, mycorrhizal and parasitic.

Parasitic fungi feed on living organisms and include microfungi such as Ringworm and Tinea which live on humans and other animals.



Dermocybe splendida
Brown cap, yellow stem and fiery orange gills.
A mycorrhizal fungus of the Karri forest.

In this group are some fascinating, gruesome species which parasitise insects, such as the 'caterpillar fungi', *Cordiceps* spp. In the karri forest on our property, I have found the largest one I have seen. Protruding above the leaf litter I noticed a grey, 7 cm pencil-like structure - which I fortunately recognised, because there was a further 19 cm buried in the soil and this required some careful digging to keep in one piece. The very base is a perfect caterpillar shape. I was not so fortunate with another one I found in an area peppered with conglomerate rock. I just couldn't get to the base, but on the same day I collected *Cordyceps militaris*, which has a bright orange fruit body (in the form of short, club-like structures) and was growing from a cocoon lying on top of the ground.

The largest group are the saprotrophs. They utilise dead organic matter, both plant and animal, and are great recyclers. Huge fallen trunks of karri trees in the forest are covered with a myriad of fungi, ranging in size from the large yellow-orange shelf fungus, Curry Punk, *Piptoporus australiensis*, to groups of minuscule species such as Mycena. In undisturbed bush, the rate of build-up of leaf litter and other debris is equalled by the rate at which it is broken down by fungi and other organisms. Saprophytic fungi also include commercially-grown species such as the oyster fungus, *Pleuroyus ostreatus*, and the common cultivated mushroom, *Agaricus bisporus*. Ephemeral ink caps, *Coprinus* spp., bird's nest fungi, *Nidula* spp., and tiny orange discs with a fine fringe of black hairs around the rim - the eyelash fungi, *Scutellinia* spp. - are all included in this group. There are even entire books devoted to the dung fungi!

Mycorrhizal fungi are those which form a symbiotic, or mutually beneficial, relationship with plants. As a rule, neither of them can grow successfully without the other. (It is of interest to note that the seeds of Australian orchids will not germinate without the help of microscopic symbiotic fungi.) The role of mycorrhizal fungi is of vital importance in our nutrient-poor soils.

Prepare for your Fungal Foray this June, buy a fungi book!
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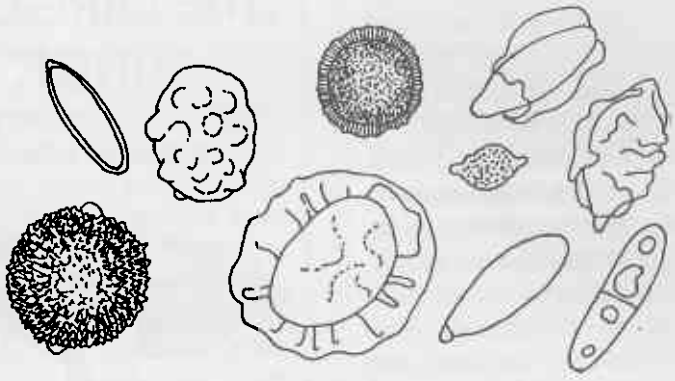
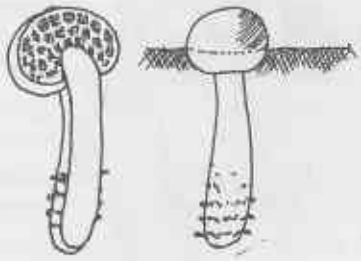
Their hyphae form a sheath around the rootlets of trees and woody plants. Fungal threads then grow throughout the surrounding soil, taking up nutrients such as nitrogen and phosphorus and passing them on to the plant associate. The plant, in return, passes carbohydrate to the fungus. A great deal of research is being expended on this group and Australian fungi are currently being introduced to the vast eucalypt plantations in China.

Many of the larger fungi lie hidden under the leaf litter or just below the soil surface, and their role is very interesting indeed. A three-way relationship is at work, involving fungi, plants and small native mammals such as Potoroos and Woylies. In order to colonise new areas, these fungi must be eaten and the spores spread by the animals.

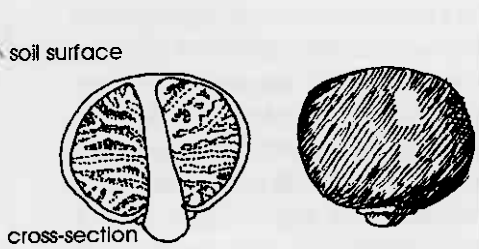
Once thought to be extinct, Gilbert's Potoroo was recently rediscovered in the Two People's Bay Nature Reserve. I managed to obtain some Potoroo scats and examined a minute part of one under the microscope - lo and behold! the spores of many different types of fungi were revealed! Potoroos and Woylies live almost exclusively on underground fungi, but other small marsupials such as native rats and bandicoots also eat them. These fungi must have some sort of a smell which is not necessarily noticeable to humans, however, many do have a very strong perfume. A group of bright yellow underground fungi, *Stephanospora* sp., which I found near Lake Gardiner at Two People's Bay, smelt gorgeous - just like a sweet shop. These 'truffles' are mostly quite small, on an average only 1 - 2 cm across. The Native Truffle, *Choiromyces aboriginum*, is well-documented as food in Central Australia, but there are no historical records of the use of truffle-like fungi by the Nyoongar people. They did, however, eat the Beefsteak Fungus, *Fistulina hepatica*, which grows on trees and Native Bread, *Polyporus mylittae*, which produces a large underground sclerotium, and a few others.



Some of the fungi spores seen in Potoroo scats.



Torrendia arenaria
a truffle-like fungus.
Two Peoples Bay Nature Reserve



Thaxterogaster sp.
a truffle-like fungus found underground.
Two Peoples Bay Nature Reserve

Katrina Syme is a consultant mycologist and talented artist. She has carried out a comprehensive survey of fungi in Two Peoples Bay Nature Reserve during 1991-92. During this survey, 441 different species of larger fungi were collected, many of which are new to science. In conjunction with CSIRO, she is currently carrying out further studies on fungal ecology in the southern jarrah forest and writing/ illustrating a book on fungi. She also teaches natural history painting through UWA Extension and is a member of the Botanical Artists' Group. She can be contacted at: RMB 1020, South Coast Highway, Denmark, WA 6333.

Would you like to help increase our knowledge of Australian fungi?

Fifty species of fungi are being targeted by the Australian Fungi Mapping Scheme, or FUNGIMAP, which is centred in Victoria. All these species are illustrated in Bruce Fuhrer's 'Field Companion to Australian Fungi'. This project aims to improve knowledge of the distribution of fungal species in Australia.

For more information, contact
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