



Forest Fungi:

lifestyles of the
little-known



Western Australia's
south-west is one of the most
botanically diverse regions in the world.

It is particularly renowned for its
wildflowers. However, the fungi is even more
diverse. The jarrah, karri and tingle forests
are home to an amazing range of fungi,
with an incredible variety of forms,
colours and lifestyles.

photographs and story by Richard Robinson

Fungi play important roles in ecosystems. In forests, they are the recyclers, breaking down litter and debris to provide nutrients for plants. They also help the plants take up these nutrients. Underground truffle-like fungi provide food for several native mammals including the woylie and potoroo.

For most of their existence, fungi persist in the form of microscopic filaments called hyphae. Hyphae colonise the soil or other surfaces such as litter or wood, and at certain times of the year they develop the fruit bodies we refer to as mushrooms, toadstools or brackets. Most fungi fruit in autumn or winter, but a few fruit in the spring.

In the south-west forests, there are



hundreds of species of fungi to be encountered. Very few of them have been formally described and named, but many can be readily recognised and appreciated. A forthcoming Bush Book, *Fungi of the South-West Forests*, introduces readers to the world of fungi and the array of species found in the southern forests.

FUNGAL GROUPS

There are two main types of fungi, the Basidiomycetes and the Ascomycetes. They differ in the way they produce their spores, a feature that can only be seen microscopically.

Fungi can be separated into a number of groups based on the shape of their fruit bodies. The Basidiomycetes, for example, include agarics (mushrooms with gills such as the common field mushroom) and boletes (mushrooms with pores). There are also coral fungi, the well-known puff balls, spine fungi, truffle-like fungi that fruit beneath the ground, leather and crust fungi that form thin, leathery sheets on sticks and wood, bracket-like fungi that grow on trees and wood, and jelly fungi. Ascomycetes are a diverse group that includes cup fungi, earth tongues, morels and flask fungi.

FATAL FUNGI

Amanitas are known to be poisonous. The notorious death cap (*Amanita phalloides*) causes about 95 per cent of deaths due to eating fungi, but fortunately it is not found in WA (though other *Amanita* species have caused severe cases of poisoning in WA). Amanitas are readily recognised, as most have a fruit body with scales or warts on the cap and a stem emerging from a sac-like base. The stem usually (but not always) has a ring just below the cap.

Karri amanita (*Amanita ananiceps*) is a large, distinctive pure white species

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Main: Rhubarb fungus (*Boletellus obscurecoccineus*).

Background: Jarrah forest understorey.

Photo – Chris Garnett

Insets from bottom left: The stone truffle (*Mesophellia trabalis*); tingle wax cap (*Hygrocybe* sp.); beefsteak fungus (*Fistulina hepatica*); and yellow-headed amanita (*Amanita xanthocephala*).

Top left: Woylies are one of the small native animals that utilise underground truffle-like fungi as a food source.

Photo – Jiri Lochman

Above left: The karri amanita (*Amanita ananiceps*) often has a ragged, fairy-like skirt.

Left: Mushrooms of the ghoulish fungus (*Hebeloma aminophilum*) are found around the corpses of kangaroos.





found in wet karri forest. Its cap has raised, irregular-shaped warts and white gills. As the mushroom expands, a mealy veil that once covered and protected the immature gills forms a ragged but attractive fairy-like skirt around the rim of the cap and a fragile ring around the stem.

Yellow-headed amanita (*Amanita xanthocephala*) is found in the litter on the forest floor, or on bare soil. The small yellow to orange cap has distinctive white or yellowish scales on the surface. The white stem emerges from a bulbous, cup-like base that has a yellow or orange rim.

GHOULS AND PARASITES

The intriguing ghoulish fungus (*Hebeloma aminophilum*) derives its name from its habit of growing around the carcasses of dead animals, where it obtains nutrients from decaying animal matter. Mushrooms generally appear in the early autumn, around the corpses of kangaroos that have been decaying for about six months.

Above: The parasitic honey fungus (*Armillaria luteobubalina*) attacks and invariably kills shrub and tree species.

Right: A flask fungus known as the bolete eater (*Hypomyces chrysospermum*) parasitises several species of bolete mushrooms.

The honey fungus (*Armillaria luteobubalina*) is parasitic, and can infect and kill most shrub and tree species in both forests and gardens. It often fruits in large clusters on the stems or at the base of dead trees and shrubs in the early winter. The light yellow caps have a dense covering of small black to brown scales near the centre that feel like a cat's tongue when you rub a finger across them. The gills are white to cream, and the yellowish-white stem has a ring just below the cap and a blush of pink colour above the ring.

A flask fungus known as the bolete eater (*Hypomyces chrysospermum*) doesn't form its own recognisable fruit body, but parasitises several species of bolete mushrooms. It starts as a white mould that attacks the bolete, then turns bright yellow and powdery. Eventually, the host mushroom becomes soft and mushy with an odour resembling that of dead fish. The final stage of development, a reddish-brown pimpled crust, is rarely seen, as it occurs only after the host has decayed beyond recognition.





Left: Archer's cortinari (*Cortinarius archeri*) is common in jarrah forest.

Centre left: Delicate pink chantarelles (*Cantharellus* aff. *cinnabarinus* var. *australiensis*) contrast with the dark leaf litter in which they grow.

Below left: The yellow and maroon colours give plums and custard (*Tricholomopsis rutilans*) its unusual common name.

VEILED BEAUTIES AND COLOURFUL CAPS

Many species of *Cortinarius* grow in the south-west forests. Most are undescribed, but are readily recognised. Their distinguishing feature is a cobweb-like structure called a veil (*Cortinarius* means 'pertaining to curtains') that stretches from the upper stem to the cap margin in young fruit bodies. When the fruit body expands, the veil tears away and may persist as sparse filaments on the upper stem.

Archer's cortinari (*Cortinarius archeri*) is a large violet mushroom with a sticky or slimy cap. The membranous veil also has a sticky coating and may persist on the upper stem as a sticky ring. It is common in jarrah forest, fruiting among leaf litter or along roadsides.

Pink chantarelles (*Cantharellus* aff. *cinnabarinus* var. *australiensis*) are among the most exquisite mushrooms you might encounter. Their delicate pink colour contrasts with the harsh dark brownish-black leaf litter in which they fruit. When fully expanded, the cap is often lobed and upturned. Under the cap, the light pinkish-white gills are broad and shallow. They are sometimes forked and they run down the upper stem.

Wax gills (*Hygrocybe* species) are generally brightly coloured. The gills have a waxy appearance and texture, and the caps and stems can often feel greasy or slimy. Tingle wax cap (*Hygrocybe* sp.) has a small cap that does not appear to fully open, and a long stem. The red caps stand out like beacons on the dark tingle and karri forest floor.

Plums and custard (*Tricholomopsis rutilans*) is a large, eye-catching



mushroom. Its common name is derived from its bright, contrasting colours. Maroon shaggy scales cover the cap, and the gills are a rich yellow. Plums and custard is uncommon in the south-west. It fruits on rotting stumps and large pieces of wood derived from various tree species, including banksias growing in jarrah forests.

BOLETES

Boletes have a typical mushroom shape, but with a layer of sponge-like pores on the underside of their cap instead of gills. Many species within this group have flesh or pores that stain blue, red or brown when the mushrooms are cut or bruised.

The ridge-stemmed bolete (*Austroboletus occidentalis*) has a deeply reticulated or ridged stem. The large light brown caps may be dome-shaped when they first appear, but then flatten out. Under the cap is a delicate pink layer of pores. The distinctive stem is sticky or slimy and leaves a yellow stain and a bitter taste on your hands if you handle it.

The rhubarb fungus (*Boletellus obscurecoccineus*) is a magnificent deep red bolete with bright yellow pores. Unlike a lot of other brightly-coloured boletes, its flesh does not stain if it is cut or bruised. It may grow in small groups but is usually seen as a single mushroom.

EARTH STARS

Puff balls are well-known to most people, occurring on almost every lawn. As they mature, the sac splits open to release a dry mass of spores. Earth stars (*Geastrum* species) are puff balls that emerge to sit atop a star-shaped podium.

The earth star starts as a leathery sphere that splits radially to form a six to seven point star. Inside is a delicate



sac that has an opening at the top through which the dark brown spores are released. As *Geastrum javanicum* ages, the arms of the star curl under and may split off. There are several

species of *Geastrum* that look very similar. Due to their colour and appearance, earth stars are almost invisible, hiding among the leaf litter on the forest floor.



Above right: Ridge-stemmed bolete (*Austroboletus occidentalis*) has a sticky or slimy stem that leaves a yellow stain on your hands.

Right: The earth star (*Geastrum javanicum*) is a puff ball, and when it is mature the outer covering splits to form a six to seven point star.



Left: Crowned coral fungus (*Clavicornia piperata*) is found growing on wood.

Below left: Hedgehog fungus (*Hydnum repandum*) is recognised by the cream to pinkish spines on the underside of the cap.

Below: Hairy panus (*Panus fasciatus*) has beautiful lilac-coloured gills.

CORALS, SPINES, HAIRS AND STONES

Coral fungi are typically club-like or coral-like in appearance. They are generally delicate and have a fleshy texture. The crowned coral fungus (*Clavicornia piperata*) is one of the few species of coral fungi that grow on wood. It is an attractive fungus with small crown-like structures at the apex of its branches.

Spine fungi vary greatly. They may have a typical mushroom structure, or can look somewhat coral-like. However, they have a covering of fleshy spines on the underside of their cap or, in coral-like species, pendulous spines hanging from the many branches. Hedgehog fungi (*Hydnum repandum*), for instance, look like normal beige or

chestnut brown mushrooms, but when they are turned over the lower surface of the cap is covered in cream to pinkish spines. This species fruits in the leaf litter of most eucalypt forests.

The hairy panus (*Panus fasciatus*) is one of few very hairy mushrooms in WA. Beneath the light brown, hairy cap are beautiful lilac gills that are sometimes forked and run down the apex of the stem. The stem is opaque, stout and very tough, resembling gristle. This species fruits in the spring, on dead wood in jarrah forests, and often persists as a dried specimen through the summer.

Truffle-like fungi are found below the ground or on the surface of the soil under the litter. They are generally spherical or nearly spherical, with a firm, fleshy

texture. This group of fungi provides an important food source for woylies and other small mammals of the south-west. Australia has a rich diversity of truffle-like fungi. Species of *Mesophellia* resemble stones. They have a hard, sand-encrusted casing that is usually embedded with small pebbles and plant roots. At least six species in this genus are found in the south-west.

Inside the stone truffle (*Mesophellia trabalis*) is an olive green spore mass surrounding a white central core. Older specimens have a distinctive odour like curdled milk, which may help animals to locate them. Animals dig them up and feed on the inner contents and, if you look carefully around diggings in the bush, you may see some discarded cases. They are an important food source, especially after fires, when diggings are very common and easy to see. The fruit bodies are present at all times of the year, and are found several centimetres below the surface of the soil, in forest and woodland areas.

BEEFSTEAK AND CURRY

The beefsteak fungus (*Fistulina hepatica*) has firm, juicy, red-marbled



flesh. It looks like an animal tongue sticking out from a tree and in some countries is known as 'ox tongue fungus'. The Aboriginal name is numar. Immature fruit bodies are purplish-red. As they mature and enlarge they become reddish-brown, and the upper surface develops characteristic wrinkles radiating from the point of attachment. The species fruits on the trunks of living jarrah trees, as well as on stumps and logs. In living trees it produces what is known as 'pencilled wood', which is highly prized for making furniture.

The curry punk fungus (*Piptoporus australiensis*) also forms brackets. When dry, they have a pungent odour resembling spicy curry, hence the common name. The bright orange to yellowish-orange brackets are tough but fleshy, and produce a strong yellow-staining juice. The brackets, which form an irregular semi-circle, are generally about 20 centimetres across, but can grow up to 50 centimetres or more. Curry punk fungus is unusual as it fruits in summer. The brackets persist for some months and are eventually bleached white by the sun and rain. A new one will often grow the following year in the same position. This fungus fruits on karri and marri wood and stumps.

The scarlet bracket fungus (*Pycnoporus coccineus*) is common in all eucalypt forests in the south-west, as well as in pine plantations and fruit orchards. It colonises dead wood, either on the ground or on living trees. The tough, bright reddish-orange brackets can be found at almost all times of the year. They eventually fade to a creamy pink colour. Very young fruit bodies are an irregular shape, but assume the bracket-like shape as they mature. As the fruit body grows it will often encompass and incorporate twigs and even living grass into its structure.

Above right: Curry punk fungus (*Piptoporus australiensis*) is a bracket fungus that can grow to be 50 centimetres or more across.

Right: Scarlet bracket fungus (*Pycnoporus coccineus*) is common in both eucalypt forests and pine plantations.





CUPS, TONGUES AND JELLIES

Many species of fungi form cup-like fruit bodies. The stalked orange peel fungus (*Aleuria rhenana*) is aptly described by its common name. It has bright orange, sometimes lobed, cups attached to whitish stems that extend into the litter. The cups appear rubbery but are easily broken.

Species of *Geoglossum* and *Trichoglossum* are called black earth tongues. They have a spade-like or tongue-shaped cap on top of a long, slender stem. The velvet black earth tongue (*Geoglossum nigratum*) stands five to seven centimetres tall, and has a dry, brownish-black stem. A similar species, known as the glutinous black earth tongue (*Geoglossum glutinosum*), differs by having a slimy or sticky stem.



Both species are common in the south-west forests.

Only a small number of species make up the jelly fungi in the south-west forests. They vary in shape and may be small, club-like or spine-like or large brain-like structures. But all have a firm, gelatinous texture. Jelly fungi have a very high water content and dehydrate quickly, shrivelling up to form hard, horny structures barely resembling their original form. The yellow brain fungus (*Tremella mesenterica*) has a yellowish-orange convoluted, brain-like fruit body with a flabby gelatinous texture. It is common on rotting wood.

So next time you venture into the forest in autumn or winter, take special note of the fungi. As well as being vital to the ecosystem, their diversity of colours, forms and lifestyles is nothing short of astounding.



Left: The stalked orange peel fungus (*Aleuria rhenana*) is aptly named.

Above: Velvet black earth tongues (*Geoglossum nigratum*) are common but hard to see amongst the leaf and twig litter.

Below left: The yellow brain fungus (*Tremella mesenterica*) is a very conspicuous jelly fungus.

If you enjoy collecting and eating wild fungi, remember that it is illegal to pick any flora in national parks—native fungi are protected under the laws protecting native Western Australian flora. However, if you wish to collect wild fungi, contact the Department of Conservation and Land Management's Wildlife Conservation Section and enquire about a collecting licence. Although many species of fungi are edible, there are also some species that are poisonous, so if you are not sure which species you have collected, get a positive identification from an expert before you consume it.

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Discover some amazing lifestyles of the little-known fungi of our south-west forests. See 'Forest fungi' on page 10.



One of WA's longest serving wildlife researchers looks at changes to nature conservation in the State. See 'For the times they are a-changin' on page 20.



Two unusual beetles are attracted to large bushfires. But why, and how do they find the fires and avoid getting burnt? See 'Australian fire-beetles' on page 36.



Two wildlife rescuers recently received Queen's birthday honours. See 'Kanyana to the rescue' on page 42.



What do wildlife officers do when a large whale weighing up to 80 tonnes becomes entangled? Turn to 'When nature calls...for help' on page 42.

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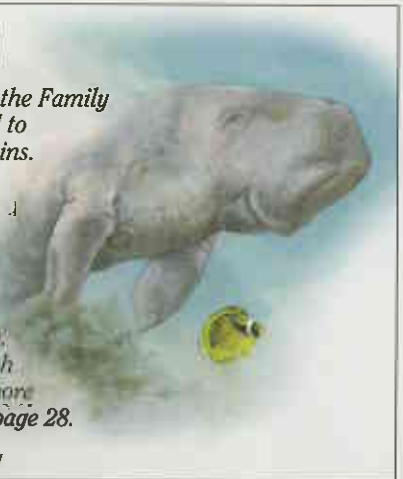
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COVER

The dugong is the only living species in the Family Dugongidae, and is more closely related to elephants than it is to whales and dolphins. One of the largest and most secure populations of dugong grazes on the extensive beds of seagrass in the shallow marine environment of Shark Bay. An estimated 10,000 dugongs, representing 10 per cent of the world's population, live in the bay. A new study, involving collaboration with local Aboriginal people, is discovering more about their movements in the bay. See page 28.

Cover illustration by Phillipa Nikulinsky



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