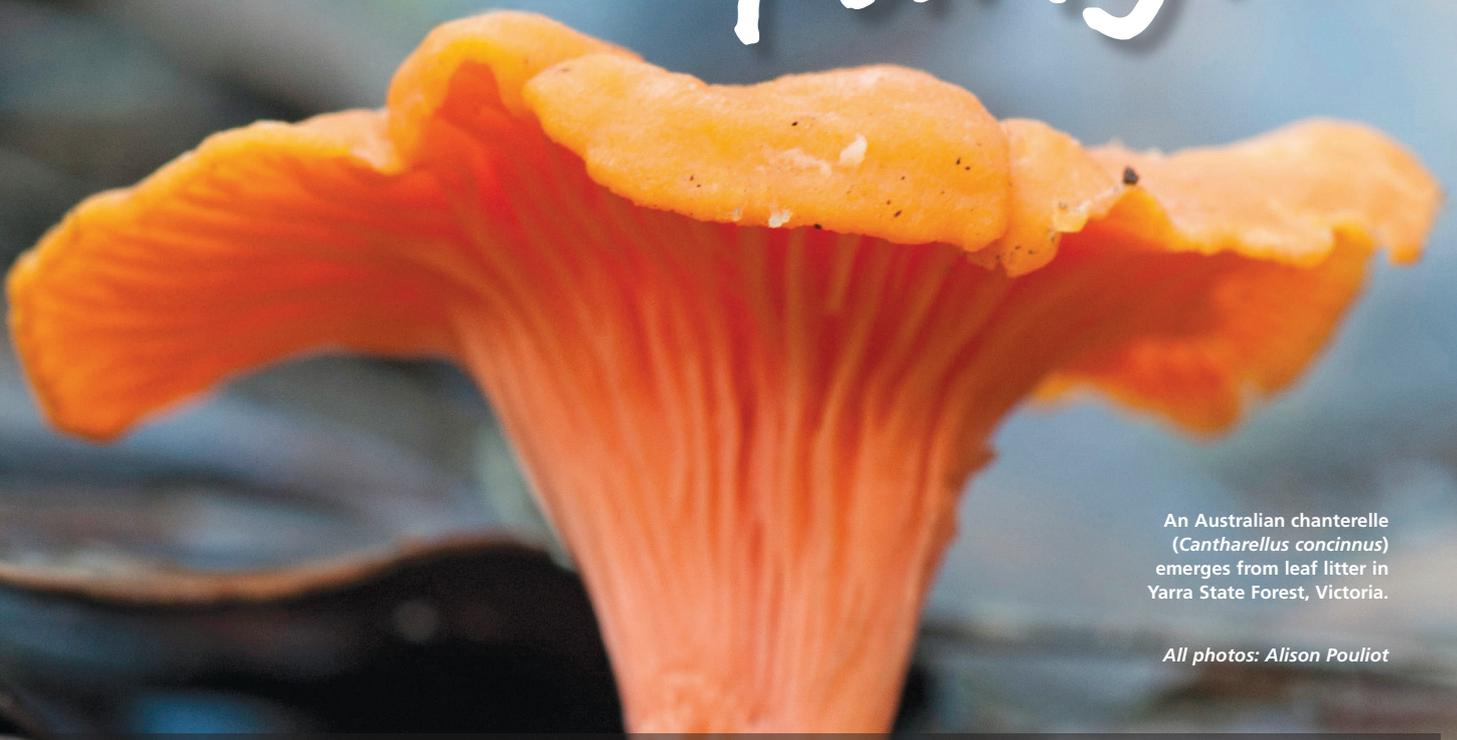


# Thinking, un-thinking, re-thinking *fungi*



An Australian chanterelle (*Cantharellus concinnus*) emerges from leaf litter in Yarra State Forest, Victoria.

All photos: Alison Pouliot

## Extracted from *The Allure Of Fungi*

While more people care about fungi in Australia today than historically, fungi remain largely absent from an ecological awareness that includes other life forms. Conservation in Australia has mostly attempted to manage nature through a command-and-control approach, rather than acknowledging and protecting its inherent connectedness. A growing environmental awareness and concern in the 1970s saw the rise of an ecological consciousness along with the establishment of more national parks. It was during this time that fungi also penetrated the remote edges of public awareness. Given the ubiquity and ecological significance of fungi, almost all environmental issues involve them. Declining air, water and soil quality, species extinction, catastrophic fire and the overarching issue of climate change all affect fungi, but the effects are seldom noticed or documented. As fungi operate on slow timescales in invisible realms, they are especially prone to changes and impacts that slip below the radar, unnoticed and unmonitored. If a fungus species or a thousand fungus species succumb to extinction in the subterrains of the soil, would anybody notice? I suspect only a few, and only then if the fungi were known in the first place, writes Alison Pouliot.

∨ **European Périgord truffle (*Tuber melanosporum*), Bern, Switzerland.** The edibility of truffle fungi has been known for thousands of years, and the European Périgord truffle is one of the most sought after. However, in Europe, truffle numbers are declining, which has been directly linked with long-term Mediterranean summer drying.



I do not recall eating mushrooms in my Australian childhood. I am not sure why they never appeared on my dinner plate, but I suspect they were too 'foreign' or 'undefinable' for my mother to contemplate buying. They were not meat, and they were not quite vegetable, and she was certainly not about to go digging for them in the dirt. The fact is, it had never actually occurred to me to eat them. I had seen the benign and insipid mushrooms (*Agaricus bisporus*) in the supermarket but somehow never linked them with the incredible representations of fungal life in the bush. I knew neither was animal or vegetable, but the similarity between the supermarket mushrooms and those in the bush ended there. Those in the wild were life forms of sheer beauty and bizarreness. Their aesthetics intensified my curiosity. I wanted to know why they looked like they did and what they were doing. ▶

^ **Black chanterelle (*Craterellus cornucopioides*), Mt Mussy, France.** Confusingly, trompette de la mort (trumpet of death) is the French vernacular name for the highly regarded edible black chanterelle. The name could, however, refer to the shape of the funeral trumpet, rather than being a reference to death.



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1. **Fungal community, St Niklaus Forest, Switzerland.** Along with bacteria and invertebrates, fungi are major decomposers or recyclers of organic matter. They are known as saprobes. Most fungi are thought to adopt a saprobic lifestyle and have been doing so for a good half billion years. That is, most fungi recycle organic matter, rather than causing disease as commonly believed. Fungi transform and configure their environments, creating new life, indeed new places, by forming connections, recycling – decomposing and composing – and building soil architecture.
2. **Anemone stinkhorn (*Aseroë rubra*), Mt Macedon, Victoria.** This was the first described fungus in Australia, catching the eye – or possibly the nose – of French naturalist Jacques Labillardière on 1 May 1792.
3. ***Mycena* sp. Strathbogie Ranges, Victoria.** The multiple appearances of umbrella-shaped sporebodies in evolutionary history suggest the great advantages of this form. Its success lies in the protection of the hymenia, which if exposed to rain, cannot effectively release spores.

4. **Fly agaric (*Amanita muscaria*), Black Forest, Germany.** Usually associated with pines and broad-leaved European trees in Australia, the fly agaric has developed a new relationship with native myrtle beech (*Nothofagus cunninghamii*) in Victoria and Tasmania. Researchers are trying to ascertain whether this fungus has displaced the beech's other ectomycorrhizal partners in the process. The dynamics are not yet properly understood, but a loss of diversity of ectomycorrhizal partners could potentially reduce the overall resilience of native beech forests.
5. **Candlesnuff fungus (*Xylaria hypoxylon*), Lyssswald, Switzerland.** A species that earned its common name from its resemblance to a snuffed-out candlewick.
6. **Lichen in a frozen waterfall, Joura, France.** Known colloquially as 'extremophiles', many lichens are able to withstand acute temperatures, desiccation, irradiation, salinity and extreme fluctuations that are intolerable to most other life.



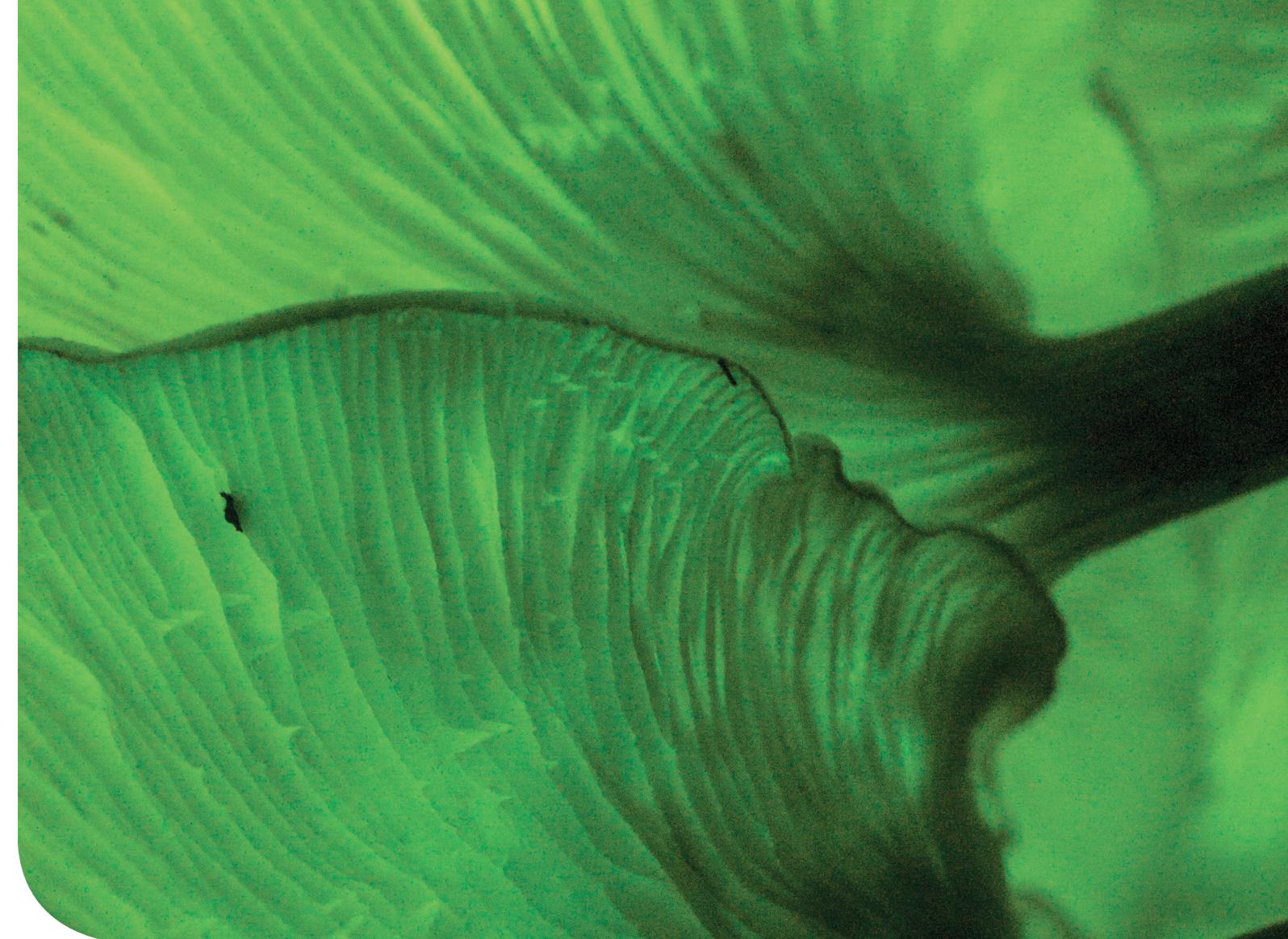
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### Unseen connections

My most immediate concern was that I had no idea how to walk in the bush. I was terrified of treading on things. Every footstep crushed stuff; tiny lichens and mushrooms, mosses and sundews, spiders sleeping inside curled leaves. There was no space to tread. How heavy did I need to be before the fungal webs of mycelia beneath the leaf litter would be destroyed? What was blatantly obvious even to a child's mind – or perhaps because I had a child's mind – was that everything in the bush was connected. Connectivities were more obvious than the distinctiveness of things. Clambering about in the bush triggered a lifelong urge to document these unseen microcosms in the hope they might not get trodden on and their connections severed.

In *The Allure of Fungi* I aim to present a more inclusive concept of fungi by proposing a shift in thinking – from thinking of sporebodies as discrete entities, to considering fungi as sophisticated entangled systems. I also propose a challenge for their inclusion within what is valued. I see it as a transition from thinking about fungi (inserting them in human consciousness) to un-thinking fungi (in the limited ways they have been perceived historically) to re-thinking fungi (within broader contexts and dimensions).

The fungal folk (as I am calling the people who have special relations with fungi) I have met offer insights from diverse cultural backgrounds ►

Can we not just let them be and value them for just being? Might we just for a moment contemplate the possibility of being 'struck incredulous', to rediscover a sense of wonder in the extraordinariness of fungal lives?

^ Ghost fungus (*Omphalotus nidiformis*), Dandenong Ranges, Victoria. Early colonists in Australia recorded Aboriginal reactions to what is thought to have been the ghost fungus. Aboriginal groups are known to respond to fungi in different ways, with some utilising them and others fearing them. Some Aboriginal groups, such as the Kombumerri of south-eastern Queensland, associated luminous fungi with evil spirits and supernatural activities of Dreamtime ancestors.

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**ALISON POULIOT** is a natural historian who is passionate about fungi. She moves between northern and southern hemispheres to have two autumns each year, guaranteeing a double dose of fungi. Her extraordinary photographs reflect her research on the ecology and conservation of fungi. In *The Allure of Fungi* she documents a forgotten corner of the natural world that is both beguiling and fundamental to life.

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Photo: Valerie Chérelat



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**1. Oyster mushroom (*Pleurotus ostreatus*), Radelfingen, Switzerland.** Fungi are often referred to as recyclers, filters or vacuums of the planet. Their capacity to both accumulate and deconstruct environmental toxins has inspired their use in detoxifying contaminated land in the process known as mycoremediation. Powerful fungal enzymes can degrade toxic components such as petroleum hydrocarbons as well as chlorinated compounds and anthracenes found in pesticides, many of which are harmful to humans. The effectiveness of the oyster mushroom has been demonstrated in breaking down polycyclic aromatic hydrocarbons found in diesel oil to carbon dioxide and water.

**2. Crowned coral fungus (*Artomyces austropiperatus*), Otways Forest, Victoria.** The crowned coral fungus is one of the few coral fungi that grows on wood.

**3. Golden curtain crust (*Stereum ostrea*), Aire Valley, Victoria.** The golden curtain crust also adorns fallen wood.

**4. Golden top or blue meanie (*Psilocybe subaeruginosa*), Korweinguboora, Victoria.** The golden top or blue meanie contains the mind-altering psychotropic compounds, psilocybin and psilocin. They're commonly found in wood chips in urban areas, gardens and playgrounds, as well as in native bush and pine plantations.

to consider fungi in different ways. So, the lack of acknowledgement of fungi in Australian environmental management and biodiversity conservation is my starting point. To be endowed with chlorophyll or a backbone is to be deemed charismatic. Such organisms have historically been the focus of conservation. In recent decades conservation shifted from species to ecosystem and landscape scales that integrate functions, processes and interactions. However, the ambiguity of concepts such as 'biodiversity' means that all groups of organisms require representative flagships and dedicated advocates.

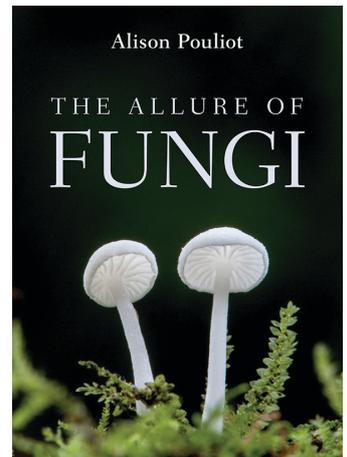
Red Lists (inventories of the conservation status of species) have helped prioritise conservation efforts. The Red-listing of fungi has been crucial to their inclusion in European conservation. The near absence of fungi on Australian Red List equivalents partly explains their exclusion from Australian biodiversity conservation.

However, the conservation dimension of *The Allure of Fungi* is not a plea to squeeze another group onto lists of species to conserve. It is not a manual on how to save the fungus kingdom. There are no dot-point lists of recommendations or policy guidelines. First we need to ask what saving fungi means, as well as the implications of not saving them. It begins with examining human–fungus relationships. This means understanding their history of exclusion from

what is valued and questioning the frames of reference that shape how we think about the natural world. It means considering fungi in larger contexts as the connective tissue of terrestrial life. It means re-envisaging the hierarchical and polarising histories that have led to the radically degraded environment in which we now find ourselves. My approach is simply a return to the dirt, to the senses and to fungus–human interactions, as a way to confront these challenges in the hope we might remember that we are part of the one ecology.

'Can I eat it?' ask foragers with predictable regularity. 'What do fungi do for the community?' asked a sceptical Canberra politician, as if admonishing them for their absence from the community sausage sizzle. 'How can fungi increase my crop yields?' asked a Queensland farmer. Exploring the tensions in considering how people use fungi, while not reducing them only to their usefulness to humans, fosters more imaginative ways of regarding them. 'Mushrooms there are, such as the *clathrus cancellatus* [sic], so strange of line and hue that he who for the first time sees them is struck incredulous: can such things really be?' asked Gordon Wasson and his wife Valentina in 1957.

Can such things really be? Can we not just let them be and value them for just being? Might we just for a moment contemplate the possibility of being 'struck incredulous', to rediscover a sense of wonder in the extraordinariness of fungal lives? ■



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