

# The Environment

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**CIWEM**



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# FUNGI

**MORE FRIEND THAN FOE**

Many people in the UK view mushrooms and toadstools with suspicion. But there is growing evidence that fungi provide materials and medicines, destroy pollutants and improve our soils – which means our mycophobia is misplaced, argues **Michael Green**

**"T**hat's not a friendly mushroom," warns a comment on a friend's Facebook feed. Over on LinkedIn, a photo of an

innocent red and white *Amanita muscaria* fungus provokes fear and loathing across the globe: "Super poison," writes a journalist from Switzerland. A user in Arizona declares it "a Covid mushroom".

But the outrage isn't just online. Mushrooms are attacked in real life too. There are websites dedicated to helping gardeners to eradicate unwanted mushrooms from their lawns and it's not uncommon in Britain to find fungi kicked over or stamped on, presumably for fear they poison humans or dogs.

These are symptoms of what mycophiles – mushroom lovers – call mycophobia, an irrational fear of fungi or, more specifically, mushrooms, the reproductive organs of fungi.

So what lies behind this fear of fungi?

Mushrooms are mysterious. Since the dawn of time, they have fascinated us and captured our imagination like no other organisms. Perceived as life-giving, mind-altering and deadly, mushrooms simultaneously inspire wonder, fear and confusion.

Humans like to put stuff into categories, so perhaps the difficulty we have had classifying fungi – considered a type of plant until the mid-20th century – tells us something about our ambivalent relationship with them.

Mycologist Giuliana Furci moved from north London's Camden Town to Chile, where she founded Fungi Foundation, a global NGO that conserves and promotes fungi. "Mycophobia is a term that's too big," she says. "In countries like Chile or the UK, there isn't an absolute mycophobia. Everybody loves yeast – what would London be without its pubs and beer, or Chile without wine?"

"Some people are afraid of mushrooms, but mushrooms are a small portion of the whole fungal kingdom, or

queendom. There are some founded fears of these macroscopic manifestations of fungi, but there is a devout love for microscopic fungi, like yeast."

#### URBAN FUNGI SAFARIS

During the lockdowns of 2020 and 2021, with travel and indoor entertainment off the menu, millions of us flocked outdoors to explore green spaces we may previously have ignored. Many of us discovered a new-found appreciation of wildlife, from trees and wildflowers, to birds and urban foxes.

However, fungi often remain overlooked. Many of us expect to find wild mushrooms only in forests. But fungi thrive in unexpected places, including big cities across the UK. Although their habitats may be fragmented or degraded, these resilient organisms are experts at finding urban niches to call home.

Mushrooms can be found growing wild in urban landscapes, from cracks in pavement slabs and car-park woodchip, to football pitches and housing-estate lawns and in neglected green spaces such as "scratty woods", the favoured habitat of Ali McKernan, who documents his passion for discovering mushrooms in unlikely locales around Bury near Manchester on his YouTube channel, The FUNgi Guy.

Mycologist and writer Roger Phillips has recorded 50 species of fungi in his neighbourhood garden, a five-minute walk from one of central London's busiest train stations.

Although you're unlikely to find big-name species, chanterelles or parrot waxcaps that rely on mature ecosystems in urban landscapes, if you slow down and look closely, you'll see that we share our urban centres with an abundance of fungal neighbours, from shaggy ink caps that decay in 24 hours, to perennial conks such as the artist's bracket.

Mushroom hunting can be a way to practise mindfulness; becoming aware of what is around in the present moment. Many mycophiles find that, as well as providing an antidote for stressful urban

## WILD MUSHROOMS: KILL OR CURE?

IN 2017, signs were erected at a Staffordshire woodland, warning visitors: "The mushrooms in this forest are poisonous. Please do not touch them."

The posters warn that *Amanita muscaria* "can be very harmful to people when consumed or in contact with skin."

*Amanita muscaria* – fly agaric – is not a species for novices. Eaten raw, it can induce vomiting and hallucinations but careful preparation can render it safe for culinary purposes and, like all mushrooms in the UK, it is safe to touch.

Worldwide estimates of fungal species range from 100,000 to the millions. Around 100 species are reported to be toxic, and around ten deadly if we eat them. Of the UK's 15,000 mushroom species, 20 to 30 have culinary value – but none are toxic to touch.

Touching mushrooms doesn't harm fungi either: a 29-year study found that long-term harvesting of mushrooms in Swiss forests did not affect mushroom yields or diversity. ●



Misconception: Fly agaric is safe to touch

lifestyles, connecting with fungi shifts their relationship with nature.

"Through fungi, I came to understand nature in a deeper way," explains writer Eugenia Bone, author of *Mycophilia* and *Fantastic Fungi*. "Fungi was the window through which I accessed a more complex picture of biology. How things are interrelated. It was a spiritual experience.



“Fungi effect weather, weather effects plants, plants effect mammals, mammals effect bacteria... it’s more of a web.”

### CHANGING THE NARRATIVE

Fungi provide a living metaphor for the interconnectedness of life on earth. So during the summer 2020 lockdown, London Fungus Network launched to help city-dwellers get to know their fungal neighbours.

With support from the London National Park City initiative, the network brings people together for fungus forays to learn about common mushroom species, online talks and Open-Myc Nights that celebrate the humble fungus in art and culture.

### It’s not uncommon in Britain to find fungi kicked over or stamped on, presumably for fear they poison humans or dogs

Attitudes towards fungi do seem to be shifting. Barely a week seems to pass without mushrooms making headlines; from medical trials using psychedelic psilocybin compounds to treat mental health disorders, to Adidas’ prototype Mylo trainers manufactured from animal-free fungal leather.

Last year brought an exhibition dedicated to the art, design and future of fungi at London’s Somerset House gallery. Furloughed entrepreneurs launched mushroom micro-farms during lockdown.



And Merlin Sheldrake’s book *Entangled Life* has spread spores of myco-curiosity to a wider public hungry to know more about these mysterious organisms.

Once the preserve of traditional medicine in Asia, powdered reishi and lion’s mane mushrooms have found their way into the western wellness industry, even artisan beverages and chocolates.

We are starting to see the narrative change from fear of fungi to fascination.

“There’s much more to this group of organisms than mushrooms,” Fucci says. “There are so many examples of fantastic interactions with humans, from the history of tweed and dyeing wool, to beverages, materials, or Stradivarius violins... [that] choose wood stained by a fungus to give that special sound. So there’s enough to convert people from mushroom-phobia to mushroom-philicia.”

### BACK TO NATURE

One little-tapped application for fungi is rewilding; restoring ecosystems through reintroducing natural processes

or missing species. “There’s a huge gap in using fungi for applied ecology and restoration,” says conservationist and founder of Rewilding Mycology David Satori. “Fungi can accelerate and increase these projects’ success.”

More than 80 per cent of plant species have symbiotic relationships with mycorrhizal fungi; ectomycorrhizae species that externally colonise plant roots or arbuscular mycorrhizae that directly penetrate the root cells, exchanging nutrients and water and creating resilience to pathogens or stresses like drought.

When human activity disturbs the soil, the mycorrhizal fungal network becomes degraded. Ali Quoreshi of the Kuwait Institute for Scientific Research argues that reinstalling these fungal-root networks is “essential” for habitat restoration.

Agriculture has used arbuscular mycorrhizal fungi for decades but we are still only learning how to apply fungi to restore disturbed landscapes, particularly with ectomycorrhizae. We need to know more about how plant-fungi-soil-climate interact in nature.

“A lot of places we are trying to rewind are different ecosystems to what we want them to be, like converting agricultural land to woodland,” says Satori. “You can’t plop a tree in the ground and expect it to grow.

“Trees need healthy microbiomes to thrive, so we should get as good at growing fungi as we are at growing trees. Fungi and trees can’t grow without each other; they are like one superorganism.”

*Michael Green is founder of London Fungus Network, a volunteer ranger with London National Park City and an environmental consultant. Follow @londonfungusnetwork or email londonfungusnetwork@hotmail.com*

## FUNGAL FUTURES: APPLIED MYCOLOGY FOR SOCIETY

◦ **Materials:** fungal mycelium is being turned into leather-free clothing, low-waste packaging, even construction materials

◦ **Medicine:** the antibiotic penicillin was originally derived from the fungal mould *P. rubens*. Fungi have been used in traditional medicine in Asia and elsewhere for millennia; now researchers are studying their potential to treat cancer, cognitive disorders and poor mental health

◦ **Rewilding and ecosystem restoration:** inoculating soils with root-dwelling mycorrhizal fungi can improve success rates of habitat restoration schemes by promoting plant and soil health

◦ **Mycoremediation:** some fungi can digest hydrocarbons, or remove toxic heavy metals from contaminated soil

◦ **Culture:** fungi continue to inspire cultures across the world.

# MAKE FRIENDS WITH LOCAL FUNGI

## rough guide to urban mushrooms



### FAIRY-RING CHAMPIGNON (MARISMIUS OREADES)

This ubiquitous species grows in dark green grass circles, known as fairy rings; a scientific term. It is distinguished by its sweet aroma, free gills unconnected to the stem and a bump in the central cap that serious mycologists call an umbo, or nipple.

**Habitat:** Amenity grassland. Loves parks and football pitches where maintenance teams try their best to stop things growing.

**Season:** June-October



### REDLEAD ROUNDHEAD (LERATIOMYCES CERES)

Imported from Australia, this handsome red species known as Larry spread around the UK via the gardening industry that provides its woodchip habitat.

**Habitat:** Check the woodchip in car parks and flowerbeds.

**Season:** Autumn-winter



### PAVEMENT MUSHROOM (AGARICUS BITORQUIS)

A cousin of the ubiquitous, mediocre-tasting cultivated white mushroom (*A. bisporus*), the pavement mushroom also has a white cap and gills that turn from pink to brown; check out its spore print. It earned its name from the way it punches through paving slabs.

**Habitat:** Pavements.

**Season:** Summer-autumn



### SHAGGY INK CAP (COPRINUS COMATUS)

Catch it while you can; the white flesh of this mushroom turns into a sticky black ink after just a day or two. Self-liquefaction, or deliquescence, enables the mushroom to release its spores to colonise new terrain.

**Habitat:** Artificially nutrient-enriched soils, such as newly installed lawns at housing developments and even the Olympic Park in Stratford.

**Season:** Summer-autumn

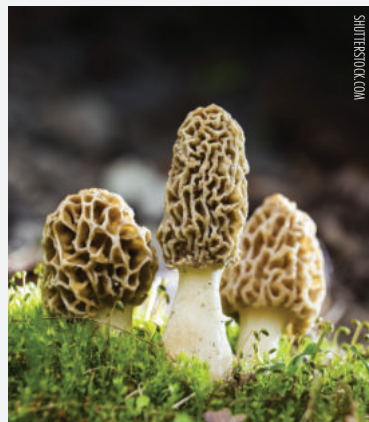


### ARTIST'S BRACKET AND SOUTHERN BRACKET (GANODERMA SP)

These huge mushrooms can be found bursting forth from tree trunks that are slowly digested from the inside by these brown-rot fungi. With a distinctive white pore surface and cinnamon spores, they are related to reishi (*G. lucidum*), a prized species in Chinese and Japanese traditional medicine and widely cultivated as a food supplement.

**Habitat:** Deciduous trees in streets, parks and woodland.

**Season:** All year



### MOREL (MORCHELLA SP)

This genus includes highly prized edible mushrooms widely collected in North America, including so-called burn morels, emerging from the previous year's forest fires. Relatively uncommon over here, these elusive fungi are a holy grail for British mushroom hunters.

**Habitat:** On woodchip at developments and car parks.

**Season:** April-May. o