

The good, the bad and the ugly—the many roles of mushrooms

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Fruiting bodies of the fly agaric mushroom *Amanita muscaria*, showing the characteristic white scales on a red cap. The mushroom produces psychoactive chemicals, so it is not surprising that this species is so commonly associated with folklore characters such as gnomes, elves, fairies and pixies. Credit: University of Bristol

A new review that investigates the true magic of mushrooms and the many roles they play in our lives, in science and in nature has been published by scientists from the University of Bristol.

The paper, which appeared recently in *Studies in Mycology*, covers model organisms used in scientific study, the edible mushrooms, the decomposers, the deadly and the toxic, all the way through to the life-saving medicinal mushrooms important for medicine

The review, led by Professor Gary Foster and Dr Andy Bailey from the University's School of Biological Sciences, covers such areas as the genus *Amanita* which contains some of the most poisonous species of fungi known.

The type-species is *Amanita muscaria*, also known as fly agaric, which has a long history for use for "recreational" or cultural purposes, as well as acknowledged insecticidal properties.

Armillaria species are also discussed – which includes *A. ostoyae*, reportedly the largest organism in the world, with one fungal colony covering around 965 hectares in an Oregon forest, leading to the name of the "Humongous Fungus".

The related *Armillaria mellea* is a highly pathogenic mushroom that is capable of killing mature trees and is the nightmare of many gardeners both in the UK and around the world.

But perhaps even more a potential nightmare for many is *Moniliophthora perniciosa* a fungus that puts chocolate production at risk, as the fungus is responsible for causing 'Witches Broom Disease' in cocoa trees. The fungus causes broom-like growths to sprout from the upper branches of infected trees, these then shower infectious spores onto neighbouring trees and the ground below.

Whilst many will be aware of the white button mushroom, many may not know the full secrets of *Pleurotus ostreatus*, the oyster mushroom, which is the second most popular edible mushroom, eaten globally. Not many

people know that this apparently unassuming species is actually a carnivore. It paralyzes and consumes small worms called nematode worms, gaining valuable nitrogen from their bodies.

Dr Kate de Mattos-Shiple, one of the lead authors, said: "The more time I've spent researching fungal Biology, the more fascinated I've become with the modest mushrooms and their relatives - really quite an astonishing group of organisms. It's been great working with such an accomplished team trying to put into words just how unique and important they are, and I hope through this paper we can convince others of the same."

And one final example from the review, *Psilocybe semilanceata*, which is one of the best-known psychedelic, or 'magic' mushrooms, which causes hallucinations and distortions in time perception. Relatives of this species may have been used ritually as long as 9000 years ago, although the first record of this exact species being consumed was accidental rather than intentional, after a London family went mushroom collecting in St James Park in 1799 and got a bit more than they bargained for!

The review also reflects some of the research strengths and interest of the Bristol Group, which ranges from work on edible mushrooms such as the edible [Agaricus](#), the white button mushroom, the pathogenic tree killer *Armillaria*, through to the discovery of new antibiotics for human medicine, such as their work on [Clitopilus](#).

More information: K.M.J. de Mattos-Shiple et al. The good, the bad and the tasty: The many roles of mushrooms, *Studies in Mycology* (2016). [DOI: 10.1016/j.simyco.2016.11.002](https://doi.org/10.1016/j.simyco.2016.11.002)

Provided by University of Bristol

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